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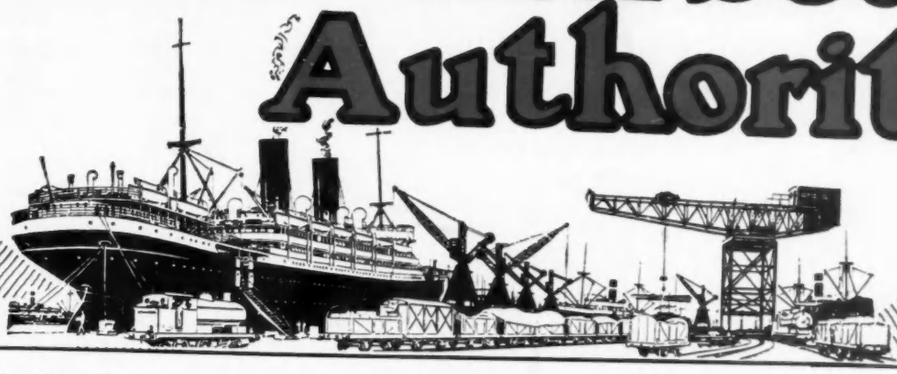

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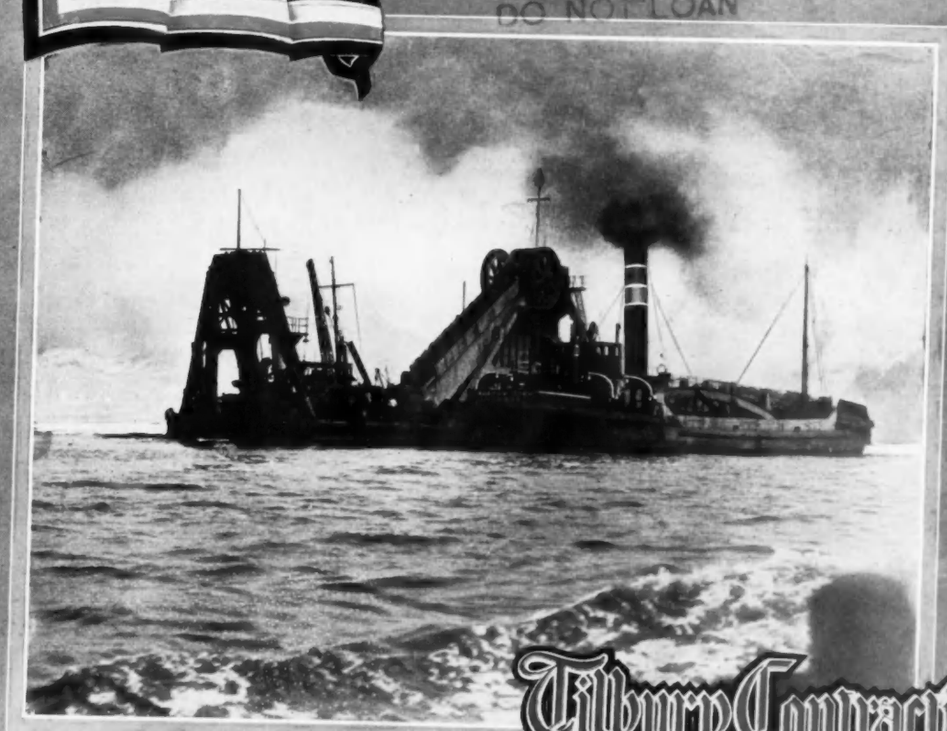

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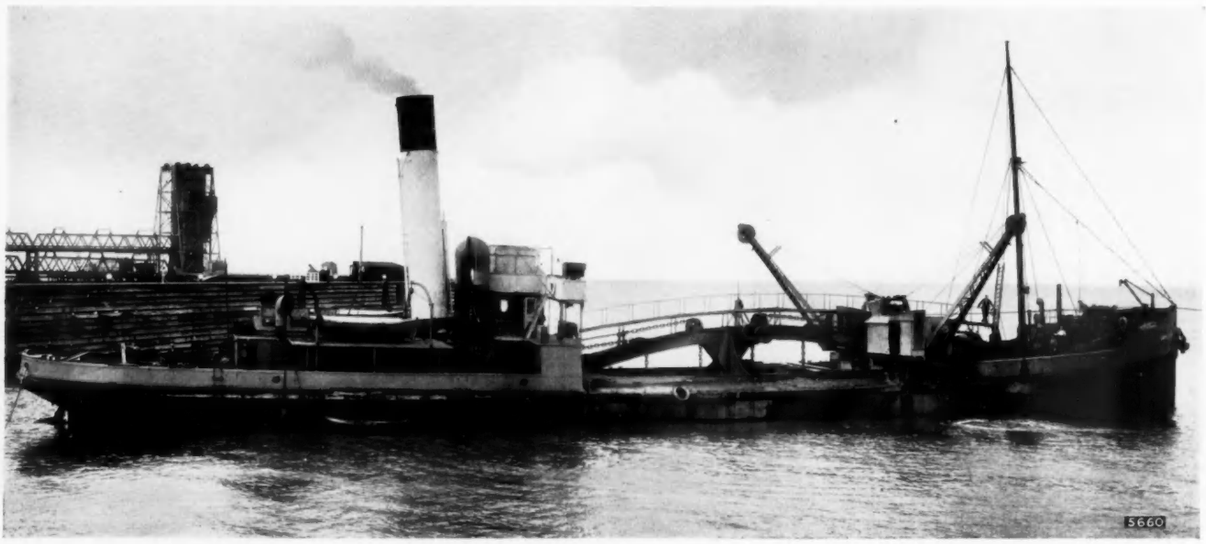

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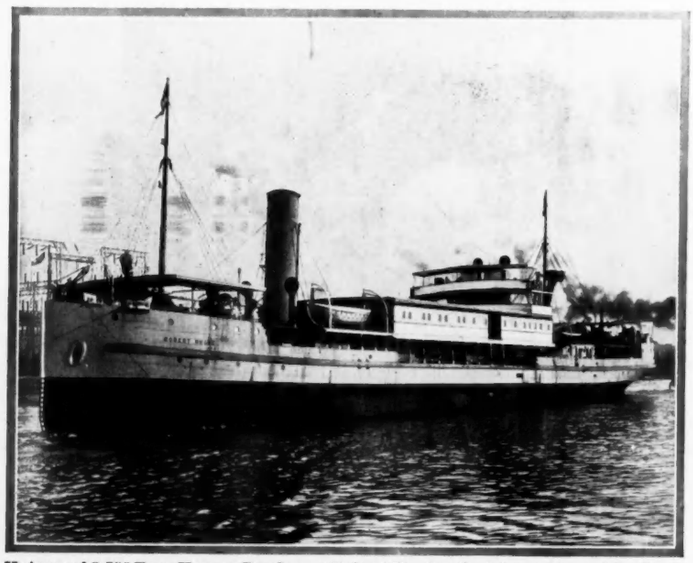

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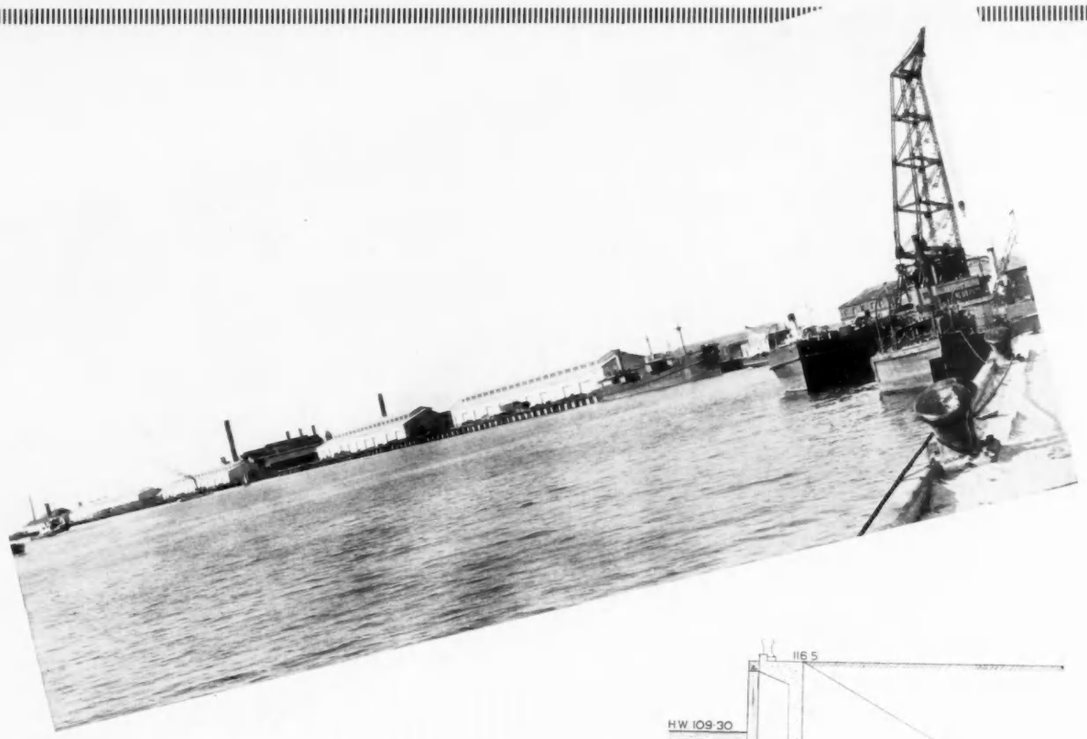

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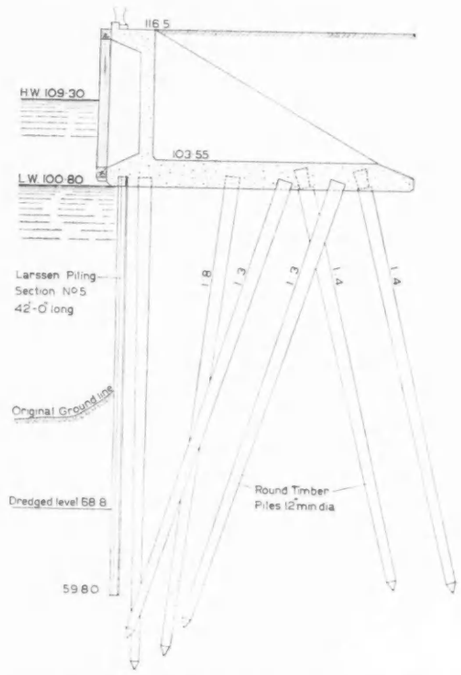

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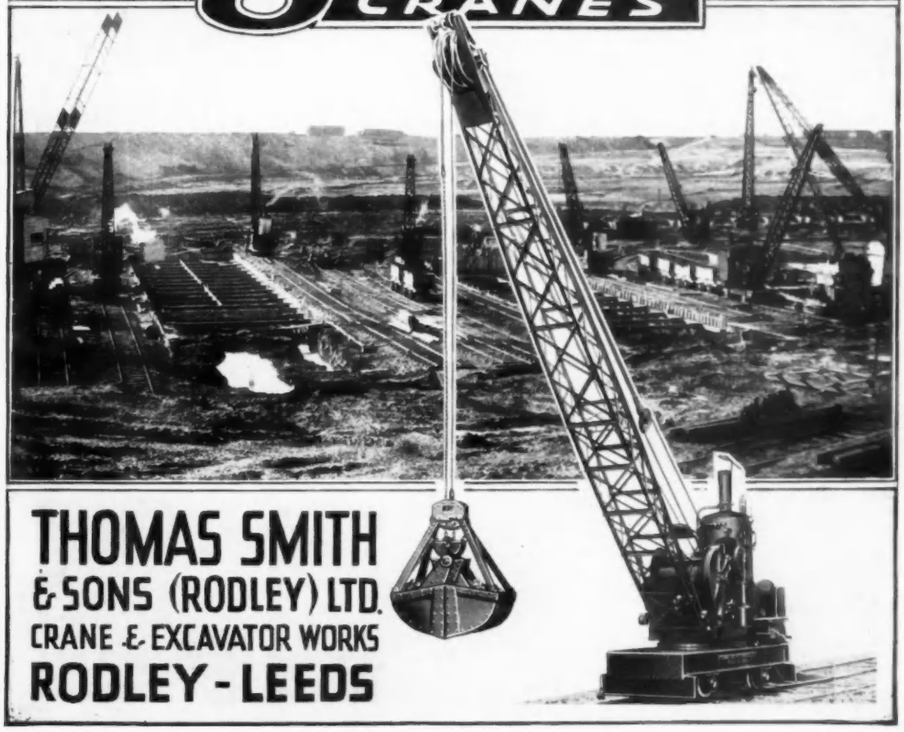

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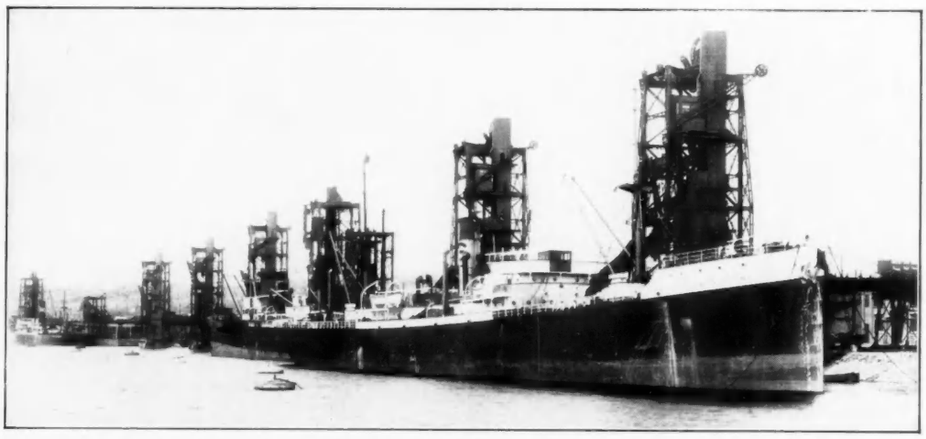

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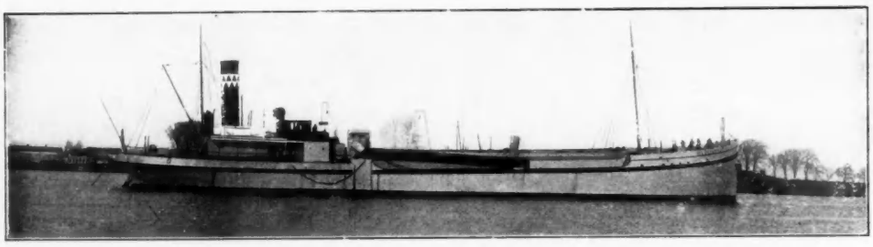

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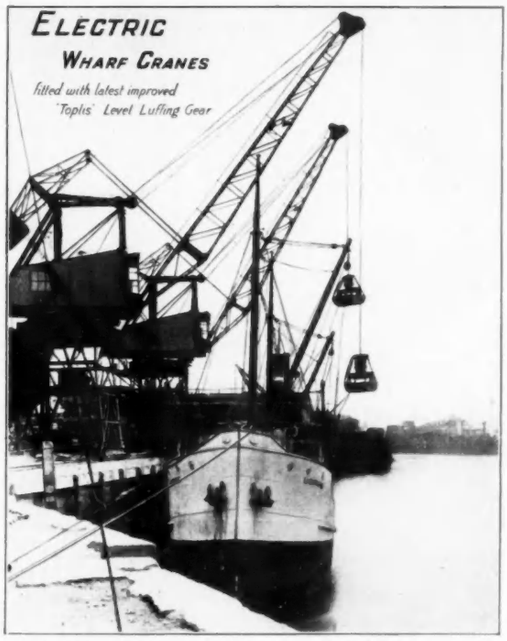

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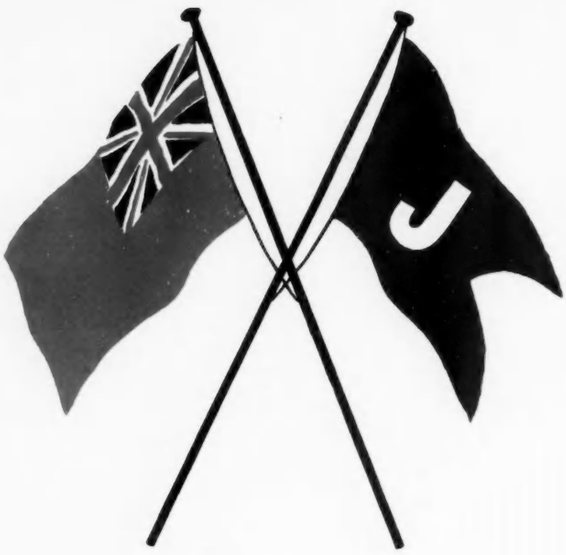

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Contributions which are to be paid for must be clearly marked thus; otherwise they will be considered gratuitous.

If intended for publication in the current month they must come to hand not later than the 20th of the preceding month.

The Editor cannot be responsible for the safety of or return of manuscripts forwarded on approval.

All letters referring to Advertisements should be addressed to the Advertisement Manager.

The following is the Scale of Charges for Advertisements:—
Twelve words for 2s.; every additional word 2d.
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Displayed Advertisements by Arrangement.

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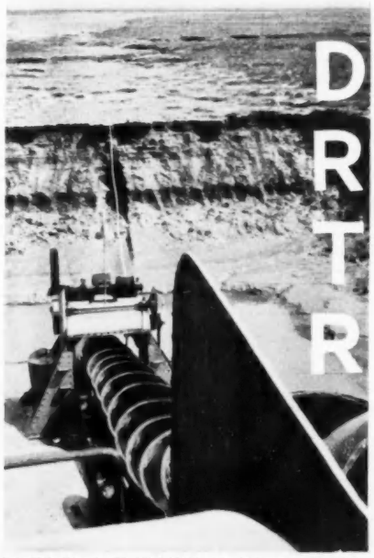

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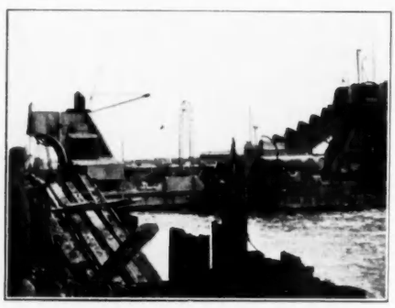

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THE DOCK & HARBOUR AUTHORITY

No. 180. Vol. XV. OCTOBER, 1935

Editorial

The Port of Setubal, Portugal.

The Port of Setubal, which is situated near the mouth of the River Sado, about forty miles south of Lisbon, lies in a large natural bay which afforded good safe anchorage to shipping, but owing to increased traffic it was decided in 1930 to construct tidal basins and wharves to facilitate the transhipment of goods and to afford good berthing space for vessels. The scheme of development, which has recently been completed, consisted of the construction of three harbours which are known as the Commercial Harbour (area 53,000 sq. yds.), the Fishing Harbour (area 36,000 sq. yds.), and the Pleasure Boat Harbour (area 6,000 sq. yds.), and the construction of six wharves in reinforced concrete having a total length of 1,410 ft.

Imports and exports at the Port of Setubal have shown a steady increase in the past few years, and the total for 1934 of imports and exports was 239,285 tons, which is the largest figure reached since 1923, with the exception of the year 1930 when 279,830 tons of imports and exports were handled.

The Port of Setubal forms the supplement for this month's issue, and an illustrated article by M. Perestrello, Director of Works of the Port of Setubal, giving details of the construction of the new port, appears on another page.

Timber Imports at Hull and Grimsby.

The docks at Hull and Grimsby devoted to the timber trade are as usual in the summer and autumn months very busy. Fortunately, this season congestion has been avoided and delays to shipping reduced to a minimum. This has been contributed to by improved arrangements for the supply of bogies and wagons, but has been due in the main to the reduced imports. Buying by importers so far this year has been very backward. In the uncertain state of the market and falling prices they have been disinclined to fill up their stocks to the same extent as formerly. The coming trade, however, is very satisfactory, and large quantities of new season's goods are being sent ex ships direct inland. The major question of an extension of dock accommodation to provide additional discharging berths at the Victoria Dock, Hull, still awaits a decision.

Death of Lord Kirkley.

By the sudden death of Lord Kirkley, the well-known shipowner, on September 12th, at Kirkley Hall, Northumberland, the North has lost one of its most prominent figures. He was seventy-two years of age, and for many years devoted the whole of his time to the betterment of the shipping industry in all its aspects.

In 1888 he went into partnership with the late Mr. Thomas Cairns, commencing a business association on Newcastle Quayside. Four years later the partners founded the Cairn Line (which in 1908 absorbed the Thompson Line). Lord Kirkley was for many years its chairman. The following year the traders of Tyneside elected him as one of their representatives on the Tyne Improvement Commission, and he commenced a career of service of the Board of that body which ended in his being voted first to the office of chairman of the Finance Committee; later, to that of deputy-chairman, and in 1925 to the chair. This post he filled for five years with conspicuous ability, at the end of which he was elected a life member of the Commission.

In 1911 he succeeded the late Mr. Thomas Cairns as chairman of the Baltic and White Sea Conference, and presided over that institution for twelve years, including the difficult war period. He was created a baronet in 1920, and the same year was elected President of the Chamber of Shipping of the United Kingdom, succeeding the late Lord Inchcape with whom he had been vice-president, and from 1919 to 1921 he was President of the Institute of Chartered Shipbrokers, and again during the year 1929-1930. He was created a baron in 1930, taking the title of Baron Kirkley of Kirkley, and in August of the same year he headed the Government Mission to South Africa set up to promote closer commercial and industrial relationships between this country and the Union.

Lord Kirkley was the first president of the Newcastle Shipbrokers' Association.

Newcastle Corporation Quay.

The question of the erection of a cargo shed on the Newcastle Corporation Quay is still under consideration. It is proposed that the shed should be 312 feet in depth and about 100 feet wide. The need for this accommodation was emphasised in the middle of August when the New Zealand steamer, "Orari" of 10,000 tons arrived at the Newcastle Quay with a cargo of meat, fruit and flour. The "Orari" was fully laden and unable to berth opposite the only shed on the Quay owing to her large draught. She had to be berthed at the far end of the Corporation Quay and part of the cargo unloaded and carried to the shed several hundred feet away. When this was brought to the knowledge of the Trade and Commerce Committee of Newcastle City Council by Quayside officials, members of the Committee visited the Quay. Alderman W. Lee (chairman) pointed out to the members that the berthing of the "Orari" was a good illustration of the necessity for proceeding with the erection of a new shed on the Quay.

Annual Meeting of the Clyde Navigation Trustees.

The annual meeting of the Clyde Navigation Trustees was held on September 3rd, and the accounts for the year ending 30th June, 1935, were presented, and showed an increase over the figures for the previous year.

The revenue amounted to £869,277 0s. 11d., this being an increase over the previous year of £72,341 16s. 5d. The expenditure charged to revenue for the year amounted to £828,837 12s. 3d., this being an increase of £62,403 16s. 1d., as compared with the previous year. The surplus revenue for the year's trading, which has been carried to the Sinking Fund, is therefore £40,439 8s. 8d., as compared with the preceding year's surplus of £30,501 8s. 1d., an increase of £9,938 0s. 4d.

The increase in revenue was chiefly made up by dues on goods, which increased by £32,233; tonnage dues on vessels of £19,489; cranes and hoists, including tramways and capstans £15,561; graving docks £3,748 and quay rents £1,366. The revenue from graving docks has shown a great advance on the previous year's figures, when a decrease was shown of £6,153.

The number of vessels and their tonnage arriving and departing from the port was 25,207 with a tonnage of 13,699,071, as compared with 24,890 vessels of 13,017,968 tons in the previous year, this being an increase of 317 vessels of 681,103 tons.

The tonnage of goods imported and exported during the year amounted to 6,480,970 tons, this being an increase of 364,518 tons over the previous year's figures, which were 6,116,452 tons.

Imports for the year under review amounted to 2,814,350 tons, an increase of 154,252 tons, compared with the previous year, and exports amounted to 3,666,620 tons, an increase of 210,266 tons over the previous year.

Madras Port Trust: Administration Report for 1934-35

I—General

THERE was a definite improvement in the volume of trade passing through the Port during the year under review, and on the whole, the outlook was brighter than at any time during the previous two years. To some extent this was due to the large quantities of rice imported from Burma and Siam, owing to the failure of crops in Southern India.

The Board, following the lead of Government has revised its scale of pay for new entrants to the Board's subordinate service.

In the Administration Report for 1933-34 mention was made of an annual recurring saving of Rs. 2,96,436 up to 1952, due to the Government of India extending the period of certain loans by 30 years. The Board in its endeavour to assist and stimulate trade generally, has utilized, with the approval of Government, most of this saving towards reducing charges on trade passing through the Port.

The following dues were abolished or reduced at the close of the year:—

(a) Quay charges on all exports.

(b) Quay dues on certain items of imports such as coal, coke, timber, oil, ores, etc.

(c) Quay dues were reduced by four annas per ton on certain classes of goods covered by overside delivery orders issued by the Steamer Agents or Captains of vessels.

The Board has also reduced the consolidated landing charge by four annas per ton.

An opportunity was taken when the reduction in dues was under consideration, to re-edit and revise the scale of rates. The new edition, which has been greatly simplified came into force on the 1st April, 1935.

Value of Trade.

The value of the total trade of the Port of Madras on private account as furnished by the Collector of Customs, representing 39 per cent. of the aggregate trade of the Presidency as against 41 per cent. in the previous year, amounted to Rs. 2,925.00 lakhs or an increase of Rs. 200.05 lakhs as compared with the previous year. Imports accounted for Rs. 1,784.65 lakhs and exports Rs. 1,140.35 lakhs as against Rs. 1,562.04 lakhs and Rs. 1,162.91 lakhs, respectively in the previous year. Foreign traffic (imports and exports combined) declined from Rs. 2,089.01 lakhs to Rs. 2,074.36 lakhs and coasting cargo increased from Rs. 635.94 lakhs to Rs. 850.64 lakhs. These figures are exclusive of Government transactions.

Receipts.

The Board's actual revenue receipts for the year amounted to Rs. 33,93,966, an increase of Rs. 3,28,892 over those of the previous year.

Working Expenses.

The gross expenditure of the year was Rs. 30,31,734 as compared with Rs. 30,00,595 of the previous year. Excluding from the gross expenditure, the interest on loans which in the year under review amounted to Rs. 7,76,325, contribution to Reserve Fund, viz., Rs. 3,30,000, repayment of debt, Rs. 1,12,627 and sinking fund Rs. 73,143 the actual working expenses came to 51.26 per cent. of the income, as against 56.49 per cent. in the previous year. For the first time for several years a contribution of Rs. 3,30,000 was made to Reserve Funds.

Sinking Fund.

A sum of Rs. 73,143 was contributed during the year towards the Sinking Fund for the repayment of the sterling loan of £330,000 raised in the London Market in 1923. The total amount of securities that stood to the credit of the Sinking Fund at the end of year was £90,213-6-11.

Outstanding Loans.

The outstanding amount of loans due to the Secretary of State for India in Council was Rs. 1,11,94,926 at the close of the year under review.

Coastal Erosion North of the Harbour.

The Committee appointed by Government to consider the above subject completed its deliberations early in the year, and later Government published the report.

The Board has considered the report and has made its recommendations to Government.

II—Traffic

Imports and Exports.

The total tonnage of imports and exports which passed through the harbour during the year under review was 1,158,876 tons or an increase of 14.83 per cent. over that of the previous year, the tonnage for the previous six years being 1,009,192 tons in 1933-34; 1,010,890 tons in 1932-33; 1,155,748 tons in 1931-32; 1,262,407 tons in 1930-31; 1,516,563 tons in 1929-30 and 1,595,891 tons in 1928-29.

Imports Generally.

The general tonnage of imports during the year was 872,158 tons, an increase of 19.8 per cent. on the previous year.

Cement.

Of the total quantity imported, viz., 8,044 tons, 94 per cent. came from Europe.

Timber.

The toal tonnage of teak imported has advanced from 17,906 tons to 18,968 tons. Of this quantity, 18,360 tons came from Rangoon as against 16,778 tons in the previous year. The imports of veneers from Port Blair fell from 3,489 to 148 tons.

Textiles.

The imports of raw cotton have fallen from 2,536 tons to 1,915 tons. The imports of twist and yarn and other textiles have advanced from 3,992 and 5,511 tons to 4,127 and 7,060 tons respectively. The imports of cotton manufacturers (piece goods) have fallen from 8,044 to 7,599 tons.

Dyeing and Tanning Substances.

Tanning substances consisting mainly of wattle bark from Africa showed a fall, the figure for the current year being 13,886 tons as against 17,026 tons of the previous year.

Motor Cars and Cycles, Ordinary.

The number of motor cars imported during the year has increased to 1,396 as against 1,328 in 1933-34, 1,044 in 1932-33 and 894 in 1931-32. Of this number, 270 came from America, 859 from Europe and 213 from Bombay. The imports of ordinary cycles and accessories have advanced from 7,547 tons to 9,266 tons. Of this quantity, 76.98 per cent. came from Europe.

Mineral Oils.

The aggregate tonnage of several kinds of mineral oils imported into this port advanced from 160,610 tons to 172,928 tons. Imports of kerosene oil in bulk have advanced from 65,550 to 67,157 tons. Of this quantity, 48,363 tons came from Rangoon, 11,376 tons from Batoum (Russia) and 7,418 tons from Palembang (Sumatra). Imports of Petrol (Benzine) have advanced from 30,722 tons to 40,847 tons. The whole of this quantity came from Rangoon. Imports of fuel oil (liquid fuel) have fallen from 57,400 tons to 57,153 tons. Of this quantity, 28,965 tons came from Abadan (Persian Gulf), 28,182 tons from Balik Papan (Borneo).

Sugar.

The imports of sugar declined from 14,022 tons to 10,510 tons.

Rice and Food Grains.

There was a phenomenal increase in rice imports, the total imports during the year being 175,252 tons as against 68,366 tons during the previous year. Of this quantity, 89,053 tons came from Burma, 71,684 tons from Siam, 10,736 tons from Haiphong, 2,650 tons from Calcutta. The imports of other food-grains including pulses and flour have fallen from 59,444 tons to 46,994 tons.

Manures.

The total tonnage of chemical manures imported has advanced from 19,143 tons to 25,199 tons.

Coal.

The tonnage of coal imported into the Port during the year amounted to 147,834 tons or an increase of 14.97 per cent. over that of the previous year:—

	1934-35 Tons	1933-34 Tons	1932-33 Tons	1931-32 Tons	1930-31 Tons	1929-30 Tons	1928-29 Tons
Imports by Rail	—	13,790	15,320	12,214	14,768	14,609	6,120
Imports by Sea	147,834	114,789	171,402	220,993	237,019	317,110	290,353
Quantity Bunkered	19,115	5,395	16,207	11,641	24,578	30,850	9,445
Coal transhipped in the Harbour	1,563	14,992	17,008	14,415	16,298	14,645	6,571
Coal booked from the Harbour by Rail	97,869	108,488	161,442	217,386	202,358	258,096	260,938

Madras Port Trust—continued

Metals.

The imports under this head advanced from 33,445 tons to 36,617 tons.

Exports Generally.

The aggregate tonnage of goods shipped from this port during the year under review amounted to 286,718 tons, against 281,203 tons of the previous year or an increase of 1.96 per cent.

Bunkers.

During the year 19,115 tons of coal and 19,546 tons of liquid fuel were shipped for bunkers. A comparative statement showing the quantity shipped during the past six years is given below:—

	1934-35	1933-34	1932-33	1931-32	1930-31	1929-30
	Tons	Tons	Tons	Tons	Tons	Tons
Coal	19,115	5,395	16,207	11,641	24,578	30,850
Liquid Fuel ...	19,546	18,688	20,749	20,193	22,442	21,975

Ores.

The shipment of this commodity advanced from 8,103 tons to 12,492 tons or by 54.16 per cent. The following table shows the shipment of the several kinds of ores during the past seven years:—

	1934-35	1933-34	1932-33	1931-32	1930-31	1929-30	1928-29
	Tons	Tons	Tons	Tons	Tons	Tons	Tons
Chrome Ore ...	8,555	3,750	6,825	2,500	8,750	8,113	6,317
Magnesite	3,915	4,353	4,695	3,891	5,201	8,995	7,289
Others	22	—	32	106	—	50	50
Total ...	12,492	8,103	11,552	6,497	13,951	17,158	13,656

Groundnuts.

The tonnage of this staple commodity of the Madras Presidency shipped at this port amounted to 174,198 tons or an increase of 0.39 per cent. on the previous year. Europe took 66.58 per cent of the total quantity shipped.

Tanned Hides and Skins.

The shipment of this commodity has fallen from 19,738 tons to 18,589 tons. Of this quantity, 92.2 per cent. was shipped to Europe.

Raw Cotton.

The exports of raw cotton have fallen from 10,470 tons to 9,586 tons.

Kerb Stones.

The shipment of kerb stones from the port fell from 10,095 tons to 6,102 tons.

Scrap Iron.

There was a fall in the shipment of scrap iron from the port, the figure for the current year being 7,127 tons.

Onions.

The shipment of this commodity advanced from 6,388 tons to 10,952 tons.

III—Marine

Shipping.

The number of vessels that entered the harbour in 1934-35 was 784 against 729 in the previous year and the total net registered tonnage increased from 2,478,301 to 2,609,138. The average tonnage of each steam or motor vessel, however, decreased from 3,617.69 to 3,505.74 registered tons due to the large number of vessels of smaller tonnage arriving during the year with rice. The total number of vessels that entered the harbour during the past five years was 820, 774, 694, 729* and 784* and the number of vessels berthed at quays during the same period was 764, 696, 647, 747* and 819* respectively.

The number of quay days vessels occupied the quays for the past five years was 1,803 days in 1930-31, 1,649 days in 1931-32, 1,578 days in 1932-33, 1,787 days in 1933-34 and 1,924 days in 1934-35.

***NOTE.—These figures are due to the fact that certain ships now occupy more than one berth successively during one stay in port.**

The Port of Colombo

New Dock to be Constructed

THE first step in the provision of further Port facilities in Colombo was taken in August when the Minister of Communications and Works, the Hon. Mr. H. M. Makan Markar, cut the first sod in connection with the excavation of the inner dock. The preliminary excavation work will provide employment for a large number of Colombo's unemployed for whom it was at present virtually impossible to find suitable work elsewhere in Colombo. The excavation of this inner dock is the first work of any considerable magnitude since 1922, in which year the late development scheme was completed. The necessity for this dock has become more and more pressing in recent years. At the present moment whenever the smaller craft which make use of this port undergo their periodical extensive refittings, the main dock has to be locked up and larger vessels in need of accommodation therein have to be turned away, with the consequent loss of revenue and employment in the port, and considerable inconvenience to the vessels which require the non-existent facilities. Congestion has become so considerable that the refitting and docking of Naval or departmental craft has only been possible by the closest co-operation of the departments concerned and even then delays and inconveniences have been frequent. The provision of this inner dock will mean that extensive repairs can be carried out to the smaller vessels without facilities having to be refused to larger and more important vessels which may be in urgent need thereof. The necessity for this extra accommodation has long been realised but the financial situation has precluded its advancement.

At first sight, this new scheme would appear open to objection that it constitutes a dock within a dock and that the inner dock could not be occupied or vacated while the outer one was in occupation. To this the answer is, that it is admitted that the scheme is not perfect, but that it is the best possible in existing circumstances. In the first place such other sites as would appear to be available must necessarily be reserved for future important developments, such as the Oil Dock and the Deep Water Quay which was totally unconnected with and by no means a necessary corollary of the scheme which has been inaugurated. Another important reason is that of economy. It is obviously advantageous to make use of land unlikely ever to be required for other purposes and at the same time to utilize the existing Pumping Station, Guide Pier, Dolphin and Caisson, which, of course, could not have been done had the new dock been situated at some distance from the present Graving Dock. The apparent disadvantage of prospective entrants to this dock being obliged to approach it through the old dock can by exercise of systematic planning be wholly or at least mainly avoided. It can, for instance, be arranged to dock smaller vessels which require extensive routine repairs at a date determined well beforehand when the occupation of the existing Graving Dock by larger vessels will cause no inconvenience. Its existence will preclude emergency repairs to large vessels having to be attended to at other ports because the only dock is occupied by some Port Commission vessel which is not in a state to be floated out at a few hours' notice.

The dock will be 300 feet long by 54 feet wide and will have a depth of 20 feet at sill. The cost is estimated to be under eight lakhs of rupees and the time for construction approximately two and half years. It is hoped that it will be possible to interest His Majesty's Navy in the construction of this dock to such an extent that they will be willing to contribute their moiety of the cost on the understanding that they will be entitled to the same preferential treatment when it is required for their use as they enjoy at present in the use of the present dock to which they contributed. When this work is completed (and other facilities like the Wet Dock Quay and Oil Basin are also to be afforded to ships calling here) there will then be no serious rivalry and the Port of Colombo will be second to none in the whole world. Plans for these two major assets to the Port have already been prepared and the Port of Colombo which is the Island's best asset will soon be also one of its proudest possessions. Of the 66 million rupees already spent on the Port, 61 millions have been recouped from revenue. That is the splendid record of the efficient manner in which the Colombo Port Commission has conducted their work. They are in debt to the Central Government now only to the extent of five million rupees.

The New P. & O. Liner "Strathmore"

The trials of the new P. & O. liner "Strathmore," which is intended for the P. & O. Company's Express Service between the United Kingdom and Bombay, were held off Greenock in the middle of September, and proved entirely satisfactory.

Although the weather was very adverse owing to heavy wind and rain, the "Strathmore's" average speed over two runs of the measured mile was 21.91 knots, and this considerably exceeded the contract speed of 21 knots.

The Hull—General Arrangements.

The ship is sub-divided into 12 transverse watertight compartments up to the level of "F" Deck. She has a continuous double bottom from the collision bulkhead to the after-end of the shaft tunnels, and is divided transversely and longitudinally to provide a large number of tanks for fresh water, boiler feed water, water ballast and oil fuel. Further, the vessel, from the forward cross oil-fuel bunker to the after-end of the engine room, is protected by a complete double skin up to the water line, thus providing a maximum margin of safety at sea.

The general details of her structure are as follows:—Length B.P., 630 ft.; length overall, 665 ft.; breadth moulded, 82 ft.; breadth overall, 84 ft.; depth moulded to "F" Deck, 38 ft.; depth moulded to "E" Deck, 47.5 ft.; displacement, 28,400 tons; draft, 30 ft.; speed, 21 knots; shaft horse power, 24,000; gross register, 23,427.9; 1st class passengers, 445; tourist class passengers, 665.

The vessel has eight decks alphabetically designated "A" to "H," including the promenade decks, all intended for the use of passengers.

Cargo Arrangements.

Insulated cargo will be carried in Nos. 1, 2 and 3 holds and between decks forward. Nos. 4, 5 and 6 lower holds aft will be used for the storage of general cargo, and provision is made for the carrying of passengers' motor cars. Cargo will be worked by means of derricks served by 3 and 5-ton winches, distributed throughout the vessel, while in addition four 10-ton derricks are fitted. The arrangements are of the latest and most efficient type for the rapid handling of cargo.

Engines.

The vessel is propelled by twin screws, each driven by a set of Parsons Turbines, through single reduction gearing, each set comprising one high pressure, one intermediate pressure and one low-pressure turbine, working in series and driving separate pinions engaging with the main gear wheel.

The high-pressure turbine is of the impulse-reaction type, the first stage consisting of an impulse wheel with two rows of blades, and the remainder of this turbine comprising six stages of reaction blading mounted on a hollow drum of forged steel.

The intermediate-pressure turbine is of the reaction type, having seven stages of blades mounted on a hollow forged steel drum.

The low-pressure turbine is of the single-flow type, having sixteen rows of reaction blading mounted on forged steel disc wheels.

The astern turbines for each set comprise: one high pressure and one low pressure working in series, the H.P. astern turbine is incorporated in the intermediate cylinder having one impulse three-row wheel, the low pressure astern turbine is incorporated in the L.P. casing, consisting of one two-stage impulse wheel, followed by five stages of reaction blading.

Boilers.

The steam-generating installation consists of six Babcock and Wilcox high-pressure marine-type boilers. There are four large boilers and two small boilers, and all are fitted with superheaters and tubular air heaters. The blow-off pressure of the boilers is 450 lbs. per sq. inch, and steam temperature 725° F.

The steam drums of the boilers are of seamless steel, and were manufactured by the English Steel Corporation, Sheffield.

The total generating surface of the four large boilers is 29,860 sq. ft., with a total superheating surface of 4,280 sq. ft., the total generating surface of the two small boilers being 7,170 sq. ft., with a total superheater surface of 1,434 sq. ft. The air-heating surfaces for the large and small boilers are 32,000 sq. ft. and 8,000 sq. ft. respectively.

The boilers are arranged to burn oil only under forced draught closed air duct system with open stokeholds. Air is supplied to the boilers by five double inlet electrically-driven fans of Messrs. Howden's make.

The oil-fuel installation consists of four units, each comprising one electrically-driven pump and one heater; one pair working and one pair standby.

Two oil-fuel transfer pumps of the electrically-driven two-throw type are provided, each having a capacity of 60 tons per hour for transferring oil to the settling tanks. The tube-cleaning equipment for the boilers and air heaters includes Diamond-type Soot Blowers, supplied by Messrs. Babcock and Wilcox.

Main Generators.

The main electric generating machinery consists of three steam turbo driven, direct current, compound wound, dynamos by Messrs. British Thomson-Houston Co., Ltd., each of 500/550 Kw. output at 220 v. placed in an auxiliary machinery compartment forward of the engine room. They are driven at 500 r.p.m. through single reduction, double helical gears.

The steam turbines, which run at 5,000 r.p.m., are designed for a steam pressure of 400 lbs. per sq. in. and a temperature of 700° F., but are capable of withstanding the full boiler pressure of 450 lbs. per sq. in. and a temperature of 725° F. They are of the standard B.T.H. impulse type with stainless steel blading.

The Port of Amsterdam

Statistics for the Port of Amsterdam in regard to number of vessels and tonnage, and to goods traffic arrived and sailed, as compared with the corresponding figures of last year, are as follows:—

SEAGOING VESSELS AND TONNAGE.

	ARRIVALS				SAILINGS			
	No.	Per Cent.	N.R.T.	Per Cent.	No.	Per Cent.	N.R.T.	Per Cent.
July 1934 ...	282		402,559		275		385,829	
,, 1935 ...	247		336,061		250		343,960	
	—35	—12·41	—66,498	—16·52	—25	—9·09	—41,869	—10·85
June 1935 ...	227		321,272		231		327,158	
July 1935 ...	247		336,061		250		343,960	
	+20	+8·81	+14,789	+4·60	+19	+8·23	+16,802	+5·14
Jan.-July '34	1,880		2,701,254		1,892		2,717,499	
,, '35	1,672		2,475,945		1,679		2,495,485	
	—208	—11.06	—225,309	—8·34	—213	—11·26	—222,014	—8·17

SEAGOING GOODS TRAFFIC.
(In Tons of 1000 Kilos*).

	1 Import	2 Transit incl. in col. 1	3 Export	4 Transit incl. in col. 3	5 Total col. 1 & 3
June 1934	341,771	60,265	135,601	68,993	477,372
,, 1935	259,766	48,521	117,625	52,365	377,391
	—82,005	—11,744	—17,976	—16,628	—99,981
	—23·99%	—19·49%	—13·26%	—24·10%	—20·94%
May 1935	236,051	54,869	133,506	63,473	369,557
June 1935	259,766	48,521	117,625	52,365	377,391
	+23,715	—6,348	—15,881	—11,108	+7,834
	+10·05%	—11·57%	—11·90%	—17·50%	+2·11%
Jan.-June 1934 ...	1,848,016	338,851	789,139	321,911	2,637,155
,, 1935 ...	1,624,264	358,152	838,113	364,037	2,462,377
	—223,752	+19,301	+48,974	+42,126	—174,778
	—12·11%	+5·70%	+6.21%	+13·09%	—6.63%

* These figures have been taken from the monthly statistics of the Central Bureau, The Hague, Holland.

Classified according to flag the number of vessels which entered the Port of Amsterdam during July, was:—Netherlands, 130; Great Britain, 54; German, 20; Swedish, 15; Norwegian, 9; Danish, 2; French, 1; Spanish, 1; Finnish, 1; Belgian, 4; Russian, 10.

Vessels laid-up at Amsterdam:—1st July, 1935—13 vessels, measuring 85,608 tons gross; 1st August, 1934—18 vessels, measuring 119,233 tons gross; 1st August, 1935—16 vessels, measuring 86,830 tons gross.

The Port of Copenhagen.

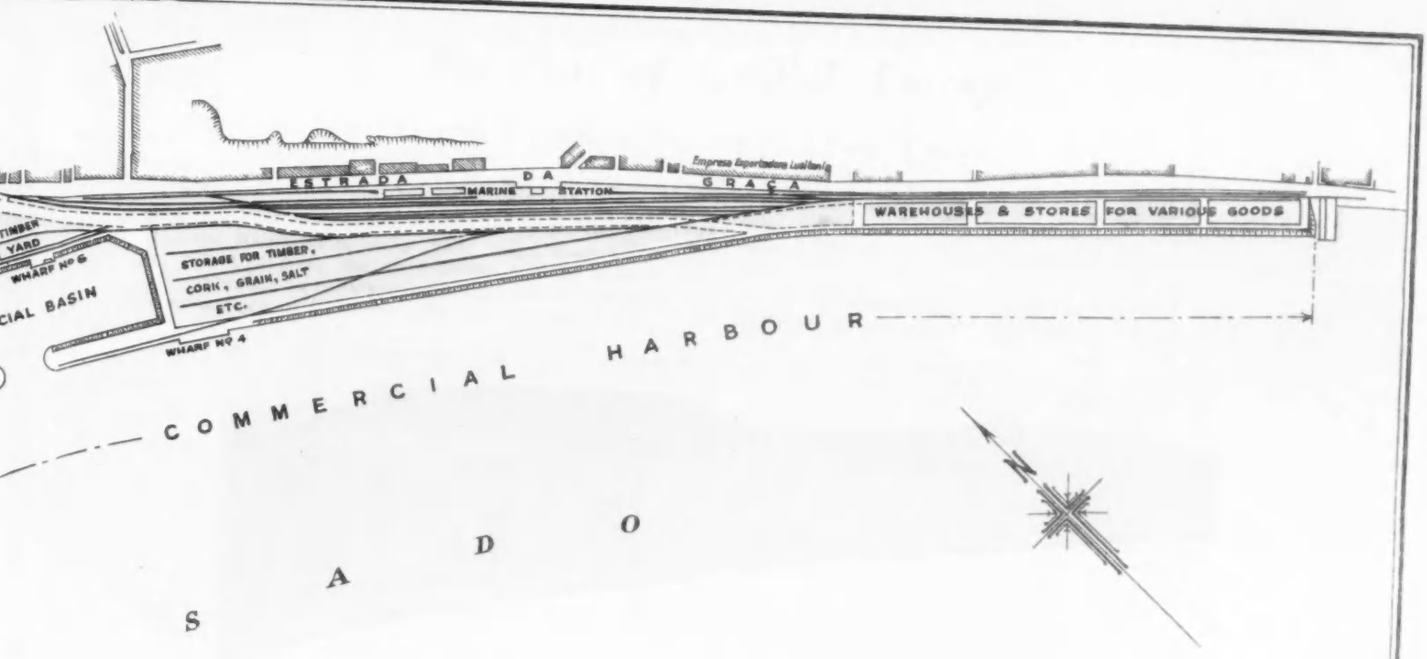
The number of ships which entered the Port of Copenhagen during August, 1935, was as follows:—From inland ports 1,801 steam and motor ships arrived of 232,551 n.r.t., and 13 sailing vessels arrived of 2,449 n.r.t. Shipping arriving from foreign ports amounted to 978 steam and motor ships of 574,606 n.r.t. and 20 sailing vessels of 7,009 n.r.t. The total of steam and motor ships and sailing vessels arriving from both inland and foreign ports for August amounted to 2,812 vessels of 816,615 n.r.t.

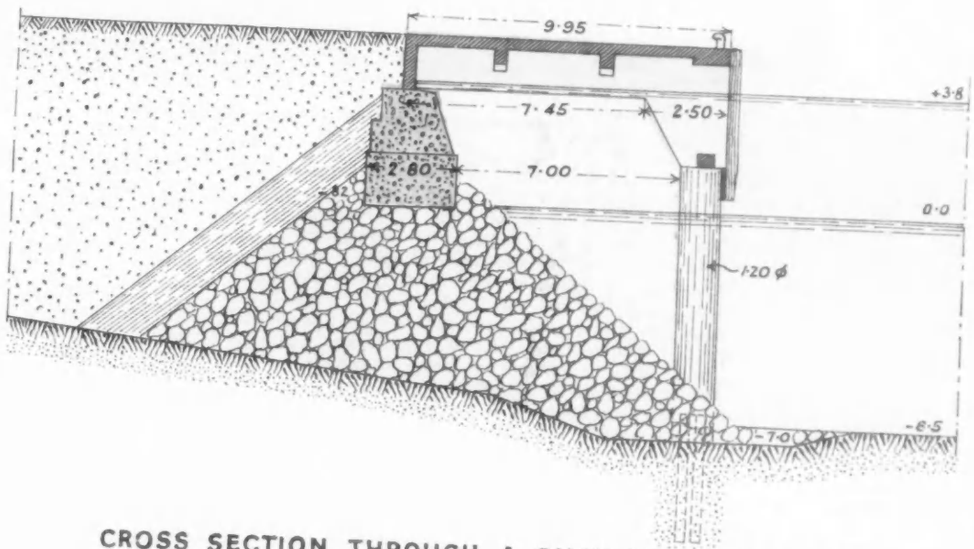
Back Harbor Notes
Oct, 1935

PORT OF SETUBAL.

UNDER THE JURISDICTION OF THE AUTONOMOUS BOARD OF THE PORT & BAY OF SETUBAL & RIVER SADO.

WARD & FOXLOW, LITHO. HARCOURT ST. MA



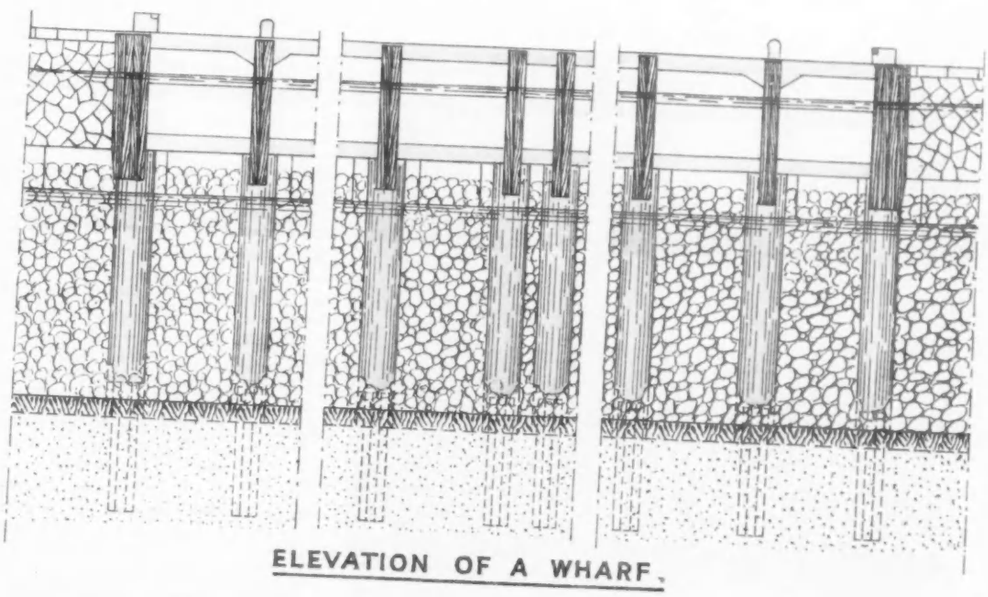


CROSS SECTION THROUGH A QUAY WALL AND WHARF.

EY MAP.

cale of Miles.

40 50 60 70 80 90 100 MILES



ELEVATION OF A WHARF.

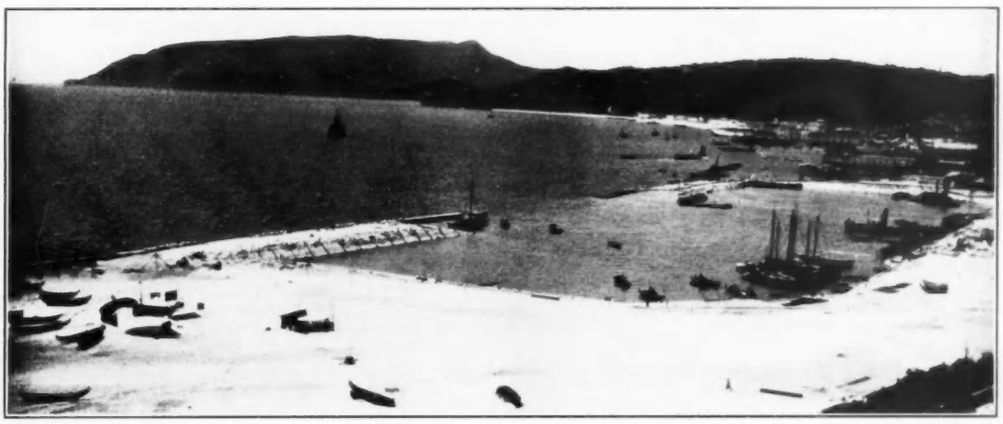
MARGARET ST. MARYLEBONE, W

The Port of Setubal, Portugal

By M. PERESTRELLO, Director of Works of the Port

Geographical Position and Natural Conditions.

THE Port of Setubal is situated near the mouth of the River Sado, about forty miles south of Lisbon. At this point the river forms a large natural bay, affording an extensive anchorage which at some points reaches a depth of 40 metres (131 feet) at low water.



Commercial Harbour in course of construction.

On the northern side the bay is flanked by a rocky coast which stretches right from the sea to Albarquel, at which point the coastline becomes flat, and along the portion occupied by the town of Setubal it forms a more or less regular curve, gradually rising till it reaches the plain which borders on the salt marshes at Marateca.

On the south side the harbour is bounded by the long Sand Bank, which separates the waters of the River Sado from the sea. The width of the harbour across the river varies between two and three miles.

In the estuary and also near the mouth of the river are found a number of sand banks and shoals.

Access to the port is through a narrow natural channel formed by the currents through the sand bar, which is situated about 5 kilometres (3 miles) from the river mouth.

The natural depth of the channel is 4.20 metres (14 feet) at high water, but it is now being dredged to a depth of 6.60 metres (22 feet) at low water, and a width of 100 metres (330 feet) over a length of 1,300 metres ($\frac{3}{4}$ of a mile).

The Headland, known as Arrábida, shelters the harbour from the prevailing winds from the north and north-east, and to the south and south-east the sand bank of Troia offers an effective protection against the attacks of wind and sea from that direction.

The littoral currents and the flow of the river are not very strong, so the harbour is neither subject to flooding nor to silting by sand or mud to any great extent.

History and Administration.

It is known of the early navigators who visited the shores of Portugal, the Phoenicians and the Greeks, that they established trading posts in this harbour, as shown by archæological finds in the ruins on the sand bank at Troia.

Later, the more natural place for a settlement, namely, the site now occupied by the town of Setubal, was built on by the Romans, who founded Caetobrix or Cetóbriga, the importance of which, however, was greatly diminished by the growth of the inland port of Alcácer do Sal, situated about 50 kilometres (30 miles) further up the River Sado. Here the Arabs, who dominated the peninsula after the Roman occupation, established one of their principal cities.

After the downfall of the Moors at the end of the 12th century, Setubal regained a little of the importance it formerly enjoyed when King Alphonso III. reinstated the town into the privileges granted it by Alphonso I. in 1149.

In recognition of the good services rendered at the battle of Santiago in 1343, Setubal was given the status of a borough. Already in the 14th century its harbour became an important strategical point, being occupied by the Castilians during the Spanish War of Succession which broke out on the death of King Ferdinand. Later, King John of Aviz fortified the place by ordering the construction of the outer walls.

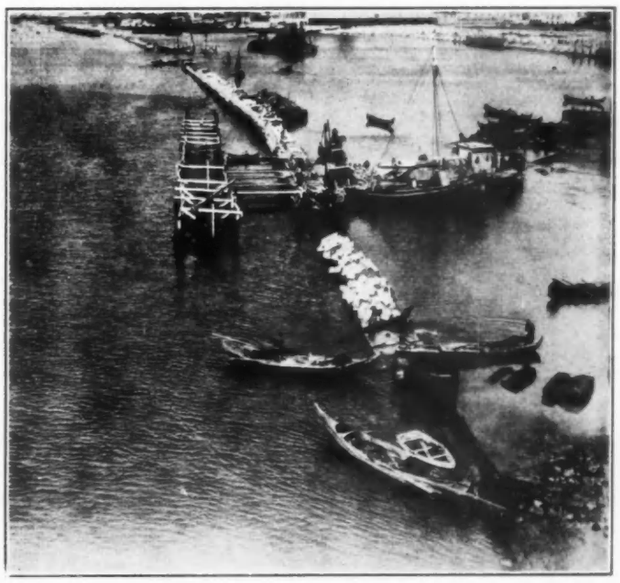
In 1458 Setubal contributed materially to the fleet which King Alphonso V. collected to conquer Alcácer-Seguer; and later it became the favourite place of residence of King John II.

Into Setubal harbour steered also the fleet of the Marquis of Santa Cruz, together with whom the Duke of Alba subsequently seized Lisbon in 1580, when Portugal was annexed by Spain. Soon after the Restoration in 1640, King John IV. had the place fortified, the inhabitants contributing voluntary payment by means of a tax on the salt from their salt works.

The fortifications of Setubal as they existed at the end of the 17th century consisted of the bastions "Conceiçao" and "Livramento," the fortified walls of Mount Saide, the fort "Veltro" and the citadel of St. Felipe, constructed by the order of Philip I. in 1595, but they were subsequently partly destroyed by the great earthquake in 1755.

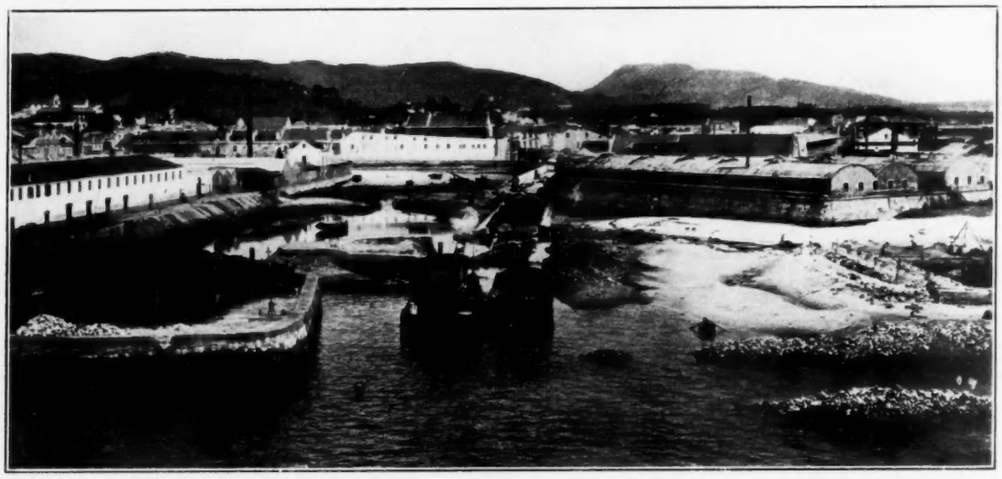
Since King Pedro V. in 1860 raised Setubal to the status of a town, it has developed very rapidly. The population, which in 1875 was about 15,000, had increased to about 50,000 in 1930, the date of the latest census. Finally, in December, 1926, the Dictatorial Government created the administrative district of Setubal, thus satisfying the legitimate aspirations of the populations between the River Tagus and the River Sado.

For some time past the Municipal Chamber of Setubal had decided to construct new harbour works, but for various reasons, which will be explained later, the Chamber, as such, could not undertake this great enterprise.



Construction of the Quay Walls.

Port of Setubal—continued



The Pleasure Harbour in course of construction.

Therefore, in December, 1923, the Government passed a new Act by which the Joint Board of the Port and Bar of Setubal and of the River Sado Authority was created and invested with powers beyond the limits of the town into the surrounding districts.

Earlier Projects and Works.

According to the investigations of the famous engineer Adolpho Loareiro, who has made the most valuable contributions to the history of the Portuguese harbours, the first project concerning this particular harbour was a dock designed by Colonel Chermont. It was situated between the two bastions "Livramento" and "Conceiçao," and was only intended to afford shelter for small vessels; but it was not until 1836 that the Municipal Chamber gave a special concession for the construction of a private dock near the mouth of the brook of Livramento, and this dock constituted during one century the only shelter the port had to offer to small vessels.

In 1855, when John Rennie (the English engineer) visited Portugal to inspect some of the harbours there, he was commissioned to advise on the principal works required at the Port of Setubal, the excellent natural conditions of which this eminent engineer had noticed.

In Rennie's report, which was submitted in March, 1857, he confined himself to recommending the construction of one or two training walls in timber or iron at the entrance of the port, in order to form guiding channels for the tidal flow and thus maintain the depth at the bar; and also the building of two quays by extending the private dock then already existing, in order to facilitate the loading and unloading of merchandise.

Although these works had the effect of regulating the river bank and providing some shelter for larger vessels, they were really not of very great importance. Only very much later, in 1876, the Municipal Chamber, to whom the proceeds from harbour dues had been conceded since 1875, put in hand the extension of the quay between the two bastions, and the reclamation of land behind this quay. In this way the area of the town was increased and the facilities for handling merchandise considerably improved, and the coastal district was made much more habitable.

The harbour dues, which already existed in 1754, were paid by all the ships that carried salt from Setubal, and the right to levy the dues was granted to the Municipal Chamber for a period of ten years, and was renewed from time to time thereafter, the last renewal being granted on the condition that a dock was to be constructed for smaller vessels near the quay at Conceiçao, and also the quay was to be extended from Livramento until Albarquel.

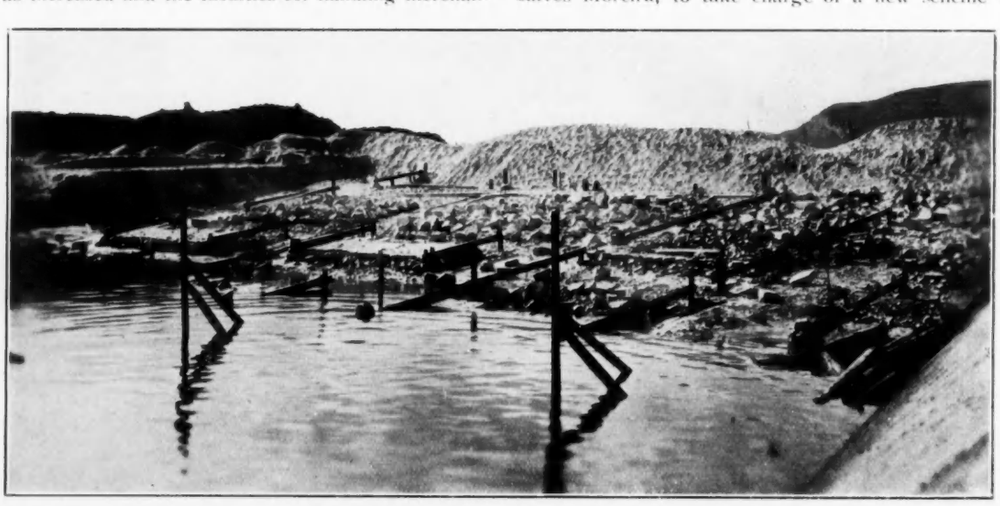
In 1901, the Municipal Chamber realised that the means at their disposal were insufficient for these works, and they therefore obtained sanction to impose duty on all goods exported from the port, except wines, and the harbour dues were replaced by a tax on all vessels crossing the bar at Setubal. On this occasion the Chamber were also authorised to raise a loan, to be repaid through the revenue from these imports. The money was to be spent on (1) the building of a quay wall along the river bank in front of the town, (2) the construction of a basin for small vessels, (3) a wharf, and (4) the continuation of the railway line—which hitherto did not extend beyond the town—unto this wharf.

Other schemes which had been considered in the meantime were the provision of a new basin and a jetty projecting from the bastion Conceiçao.

It was Vasco de Gama Braza, the engineer, who in 1892 proposed the construction of a quay wall between Albarquel and the factory belonging to M. Mendonça, the intention being to regulate the coast line, reclaim new land, and facilitate the traffic which already was of some importance.

On the strength of its new powers, the Municipal Chamber now appointed an engineer, Mr. Vasconcelos e Sá, to prepare a definite project for new harbour works. These were only partly executed, and consisted mainly of a stone glacis which later was demolished, probably because it was badly constructed.

In 1905 the Chamber employed another engineer, Mr. Goncalves Moreira, to take charge of a new scheme of harbour



New slipway in course of construction.

Port of Setubal

Wharf No. 2 in course of construction (Note the big beams which support the decking).

Wharf No. 4 in course of construction.

Port of Setubal—continued

Wharf No. 4 under construction.

improvements comprising the regulation of the river bank for a length of 1,281 metres (4,200 feet), the construction of a basin for fishing vessels near the bastion Livramento, and a large basin, 3.80 ha. (9½ acres) in area at the upstream end of the quay at Conceiçao.

In order to carry out this scheme, the cost of which was estimated at 170,000 milreis, the Municipal Chamber obtained a loan from the Companhia do Crédito Predial, and Gonçalves Moreira's project was now commenced by the manufacture of a large number of concrete blocks, and the purchase of a crane, and a dredger which, however, was never put into service.

After the financial failure of the Companhia do Crédito Predial, the progress of the works nearly came to a complete standstill for several months on account of the uncertainty about the final line of the proposed Sado Valley Railway, which was of very great importance to the port, and it was decided to delay the completion of the works.

When the line of the railway had been settled in June, 1912, the Municipal Chamber took up once more the problem of the Port, which was now considered to be one of the most urgent necessities of the town. In order to secure the money required for the realisation of their plans, the Chamber had to negotiate a fresh loan from the Caixa Geral de Depósitos partly to liquidate the previous loan and partly for the carrying out of the works.

The engineer whom the Municipal Chamber employed this time was Mr. Lisbon de Lima, who was entrusted with the preparation of an entirely new project.

This was submitted in 1914 and comprised, in the main, a regulation of the bank of the River Sado for a length of 3,546 metres (11,600 feet) along a line slightly outside the line of the previous schemes, and the construction of a large basin, about 5.90 ha. (14½ acres) in extent between Fontainhas and the bastion Livramento, the cost of the work being estimated at 15,000,000 milreis.

However, during the Great War and the difficult times which followed, and also owing to the unstable political situation, it was not considered advisable to commence the work.

Further, as previously mentioned, the Municipal Chamber was not itself capable of undertaking such extensive works; a proper institution was needed whose sole occupation would be the realisation of this large and important scheme.

Thanks to the untiring efforts of the Deputy, M. Joaquim Brandao, the Joint Authority of the Port and Bar of Setubal and the River Sado was formed in December, 1923.

Construction of the Port and Contingent Works.

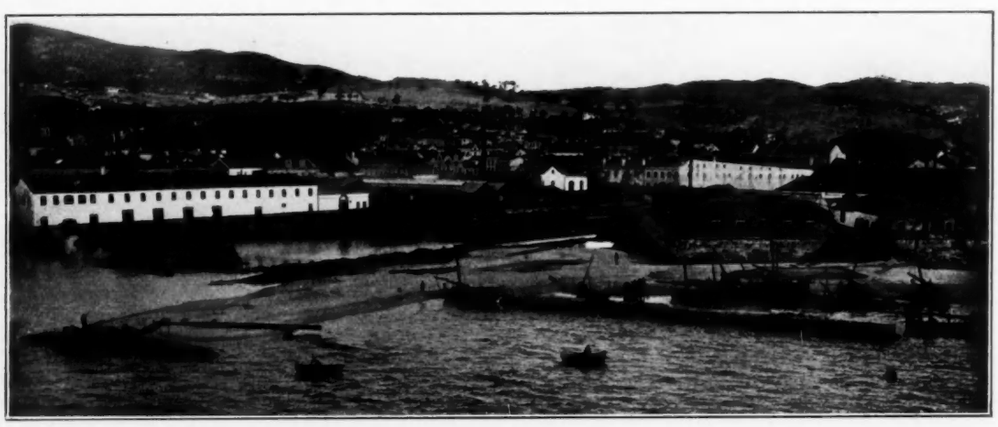
The Joint Authority, after having effected some urgent repairs and put in hand a warehouse on the small existing quay, now undertook to reconsider—and possibly carry into effect—the improvements previously proposed by the Author of this article, and in 1925 the Author was appointed Director of Works to the Joint Authority.

After a careful study of the best possible solution of the economic problems of the port and the districts to be served by the port, and taking into consideration future developments, the Joint Authority submitted in January 1926 a preliminary scheme to the General Council of Public Works. This scheme formed the basis on which the final project was elaborated, and this was approved by the same Council in November, 1927.

Similarly to previous proposals, this project consisted mainly of a regulation of the river bank, but now for a length of about 4,000 metres (13,000 feet); this was necessary not only in order to reclaim new coast land and for the improvement of the river district of the town, but also for the proper control of the currents to avoid scour in the neighbourhood of the other proposed works, which included basins for smaller boats, coastal vessels, fishing and pleasure boats. These basins were to be constructed at points where the coast already formed natural bays or inlets.

The part intended for merchant ships was to be completely separated from the part intended for the fishing vessels, and the space in between was to be laid out as recreation grounds.

It was found that the river wall from Villa Maria down to Albarquel could be carried out conveniently along a line which gave a suitable depth of water for the whole length. The type of construction had to be as economical as possible, but consideration had to be given to future developments as well as the immediate needs of the port.



The Pleasure Harbour in course of construction.

Port of Setubal

Construction of the quay walls.

Work on construction of the new port in progress.

The Pleasure Harbour in course of construction.

Port of Setubal—continued

Dredger pumping spoil ashore for reclamation purposes.

In addition to technical questions, the Joint Authority had also to consider the financial side of the undertaking. They endeavoured to obtain State participation and suggested the invitation of tenders, based on long-term payments, for the execution of the work. This procedure was sanctioned and tenders were invited in May, 1928, but the competition did not yield the results hoped for.

The inclusion in the conditions of the clause relating to the financing of the works drove away a large number of the contractors who had applied for the tender documents.

The financial position at the moment, especially after the breakdown of the Portuguese Government's negotiations for an external loan which just took place at the time tenders were being invited, caused that, out of the seven or eight contracting firms who had taken a particular interest in the scheme, only two actually tendered, both German; their prices were quite prohibitive and one of them submitted an altogether unacceptable suggestion for the financing of the project.

The competition was cancelled in August, 1928, and the Joint Authority now sought a better way of carrying into effect the proposed works.

They approached the Dictatorial Government which, in the meantime, had pledged itself to solve the difficulties of the ports in general. A special committee had been formed to study the question and classify the ports, and, on the basis of their report, the Joint Authority would be able to settle on a definite policy.

The report of the committee was submitted in December, 1928, and in it the harbour works at Setubal were classified—as could be expected—as most necessary and urgent.

In April, 1929, the classification recommended by the Committee was approved and in the budget for the financial year 1929-30 a sum of one hundred million millreis was allotted to the principal works required at the most important harbours of the country.

In September of the same year authorization was granted for the invitation of tenders for harbour works at Lisbon, Douro-Leixoes, Setúbal, Viana do Castelo, Aveiro and Vila Real de Santo António, and the amounts of the respective grants were fixed. In February, 1930, the Joint Authority issued the invitation to tender for the works at Setubal, and the tenders were submitted on May 26th. Eleven firms submitted tenders and proposals, which were carefully considered.

On June 27th, 1930, the contract was awarded to the Danish firm, Hojgaard & Schultz A/S of Copenhagen, who, with the collaboration on the dredging work of the Dutch firm, Van den Bosch & De Vries, had submitted the most favourable tender.

The other competitors were: Sociedade de Construçoes e Reparacoes Navais and Construtora Mesquita, Lda.,—both Portuguese; Constructora Fierro, Puentes y Pantanos and Sociedad Metropolitana de Construcciones—Spanish; Dyckerhoff & Widman, Grün & Bilfinger and Julius Berger—German; Nederland Waterworks Mastchapy—Dutch, and Walter Scott & Co.—English.

As the President of the Republic and some members of the Dictatorial Government happened to be in Setubal on a visit to a Regional Exhibition and in order to inaugurate the supply of electric light for the town, it was decided to take advantage of the occasion, and the foundation stone of the harbour works was laid, with great ceremony, on July 28th, 1930.

A short time afterwards, the contractors started on the preliminary works by opening up the quarry at Figueirinha, about 800 metres (½-mile) west of Tôrre de Outao, which was

Wharf No. 1 completed. Length 60 metres (about 200-ft.).

Port of Setubal -continued

Wharf used for discharging fish.

to furnish the greater part of the large quantity of stone needed for the works.

In October the first items of floating plant arrived in Setubal, consisting of a bucket dredger, two suction dredgers, and one grab dredger; various tugs, launches and barges, a floating crane of 30 tons capacity, and other sundry plant.

The dredging work was commenced on the 26th December, about five months after the laying of the foundation stone.

On January 7th, 1931, the first barge load of stone pitching was deposited on the prepared sand foundation. On top of this pitching, concrete blocks were to be placed in regular courses and the first of these blocks was set in position on the 22nd June. On July 15th of the same year, the construction of the stone glacis was put in hand at the lower end of the port.

The manufacture of concrete blocks for the foundation of the quay walls was commenced in March, 1932, and in February of the same year the building of training walls had been started. The large volume of filling which formed part of the scheme, and which amounted to some 1,500,000 cubic metres (2,000,000 cu. yds.) was obtained mainly from the deepening of the Bay of Campanário. This dredging, which was commenced on September 22nd, 1931, was done by the bucket dredger, and the material was transported to the site by flat bottomed barges. Where the depth permitted it, the material was dumped directly from the barges, but otherwise it was deposited by one of the suction dredgers.

Some of the filling material was obtained from the excavations for the foundations of the quay walls and glacis, which were carried out by grab dredger, or the deepening of the basins, which was done by the bucket dredger.

The total volume from these other sources was about 315,000 cubic metres (400,000 cubic yards). The depth of excavation for the quay walls varied between 1 metre (3.28 ft.) and 10.00 metres (32.8 ft.). The commercial basin was excavated to 3.50 metres (11.5 ft.), the fishing harbour to 2.50 metres (8.2 ft.) and the pleasure harbour to 2.00 metres (6.6 ft.).

Following the excavations, the stone pitched foundations were deposited. The total volume of these amounted to about 285,000 cubic metres (375,000 cubic yards) and they were transported to the site in hopper barges and, where the depth permitted, were tipped directly on to the bottom, or in ordinary barges from which they were thrown by hand.

The top of the pitching was regulated to the level of 0.20 by a specially constructed scraping apparatus or by means of divers, and the concrete blocks were set on this foundation. The total number of blocks was 2,800; 1,858 of them weighing 10 tons each, were employed for the quay walls, and the remaining 942 blocks, which weighed 20 tons each, were used principally at the base of the stone glacis, but also in the foundation of the quay walls.

The material for the stone pitchings came exclusively from the quarry at Figueirinha and a large part of the stone required for the glacis facings and protective works were also obtained from this source. The total quantity used for these purposes amounted to about 300,000 cubic metres (400,000 cubic yards).

In order to produce this large quantity of stone, a compressed air plant was installed in the quarry to operate the breaking hammers. The total length of piping amounted to about two miles. From the quarry the stone was transported in wagons of 1 cubic metre capacity or in wagons of 14 cubic metres capacity to two loading bridges, one of which was equipped with a wagon tippler.

A crushing plant completed the equipment of the quarry.

The stone for the facings and copings of the quay walls, which amounted to about 3,250 cubic metres (4,250 cubic yds.), was obtained from quarries at Zambujal, near Sezimbra.

The manufacture of the foundation blocks which contained in all about 18,000 cubic metres (23,500 cu. yds.) of concrete, took place at a slipway situated near the Praça da Republica. The concrete materials, sand and stone, were unloaded by a derrick crane and deposited near the mixing plant, and the cement was stored in an adjoining warehouse. From the mixer the concrete was wheeled in skips from which it was tipped directly into the forms, which were made of timber lined with sheet metal. After having matured for at least a month, the blocks were lifted on board boats and transported to the floating crane, which placed them in position.

Preserved fish ready for loading into lighters for export.

Port of Setubal—continued

The quay walls were built of mass concrete faced with stone masonry. For this work a floating mixing plant was employed and the volume of concrete placed in this manner amounted to about 12,000 cubic metres (15,700 cu. yds.).

The inner and outer stone glacis, as well as the inner sloping walls of the fishing harbour and pleasure harbour, were faced with stones measuring at least .25 metres (10 inches) on the face and .30 metres (12 inches) on the bed. They were placed on a layer of stone dust and clay in order to ensure water-tightness. The total area covered in this manner was about 26,000 square metres (31,000 square yards). Clay and stone dust was also used for sealing the stone pitchings and foundation blocks. The clay layers varied in thickness from .5 metres (1 ft. 8 in.) to 1.5 metres (4 ft. 11 in.), and the total volume deposited was about 54,000 cubic metres (71,000 cu. yds.).

by strong fenders of timber, and the longer wharves were provided with expansion joints coinciding with those of the concrete walls behind.

A total of 512 beams, 114 cylinders and 270 timber piles were used in the construction of the wharves and the total quantity of reinforced concrete in them was about 3,000 cubic metres (3,930 cubic yards).

The drainage system of the reclaimed areas had to serve as outlet for the town sewers as well. The pipes were precast in mass concrete and were of the type commonly used in Germany, Denmark, or other Northern Countries. There were 900 metres (3,000 ft.) of 50 centimetre (20 in.) pipes, 1,600 metres (5,250 ft.) of 75 centimetre (30 in.) pipes, and 1,750 metres (5,750 ft.) of 100 centimetre (40 in.) pipes—a total length of 4,250 metres (14,000 ft.). The total quantity of concrete in

Completed stone glacis at the inner end of the Port.

In order to provide berthing accommodation for larger ships, it was decided to construct a number of wharves in reinforced concrete. The method of their construction, which was proposed by the contractors, was one which enabled the work to be carried out economically as well as expeditiously, and these structures present some of the most interesting features.

There were six wharves, having a total length of 430 metres (1410 ft.). Of the four outer wharves, three were intended to accommodate larger ships with a draught not exceeding 22-ft., and the fourth was for fishing steamers. The two inner wharves, in the commercial basin, were to be made suitable for ships drawing no more than 15 ft. of water.

The type of construction was similar for all the wharves, only differing in the sizes of the principal members of construction.

The main structure, which was in reinforced concrete, consisted of L-shaped transverse beams, supported at the outer ends on cylindrical pillars and at the inner ends on a longitudinal sleeper beam which rested on the concrete wall, which again had its foundation on the stone pitching. The deck was formed as a beam and slab construction in reinforced concrete, and supported on the main L-shaped beams.

The cylinders were built by means of reinforced concrete shells, placed over groups of timber piles, which had been driven to refusal, and filled with mass concrete. The shells as well as the main beams were pre-cast in the block yard and placed by means of the floating crane.

The main beams for the largest structures were 10 metres (32.8 ft.) long and weighed 20 tons, and the corresponding cylinder shells were 11 metres (36.1 ft.) long and weighed 25 tons. The base of the pillars was protected by stone pitching.

In order to counteract the effect of any possible settlement either at the inner supporting wall or at the front cylinders, the seatings of the transverse beam as well as those of the inner longitudinal beams were formed as part of a sphere, and were set in asphalte. The outer ends of the transverse beams, near the top of the cylinders, were braced together by means of a longitudinal beam. The front of the wharves was protected

drains and 66 manholes was about 2,000 cubic metres (2,600 cubic yards).

The River Livramento was covered for a length of 160 metres (550 ft.) by means of a reinforced concrete deck, formed as three arches of 8 metres (26 ft.) span, supported on mass concrete piers.

The works also included the building of 2,100 metres (6,900 ft.) of river walls founded at level .20 and 2,170 metres (7,100 ft.) of stone glacis. Both were constructed by means of concrete blocks and substantial stone pitchings, and served to retain the reclaimed areas and also provided berthing for small boats. The total area of reclaimed land amounted to 600,000 sugare metres (720,000 square yards).

The works further included the formation of three tidal basins with their enclosing quay walls.

The basins are separated from the river by moles, the widths of which are 25 metres (82 ft.) for the commercial harbour, 15 metres (49.2 ft.) for the fishing harbour, and 10 metres (32.8 ft.) for the pleasure boat harbour. The areas of the basins are 44,000 square metres (53,000 sq. yds.), 30,000 square metres (36,000 sq. yds.) and 5,000 square metres (6,000 sq. yds.) respectively.

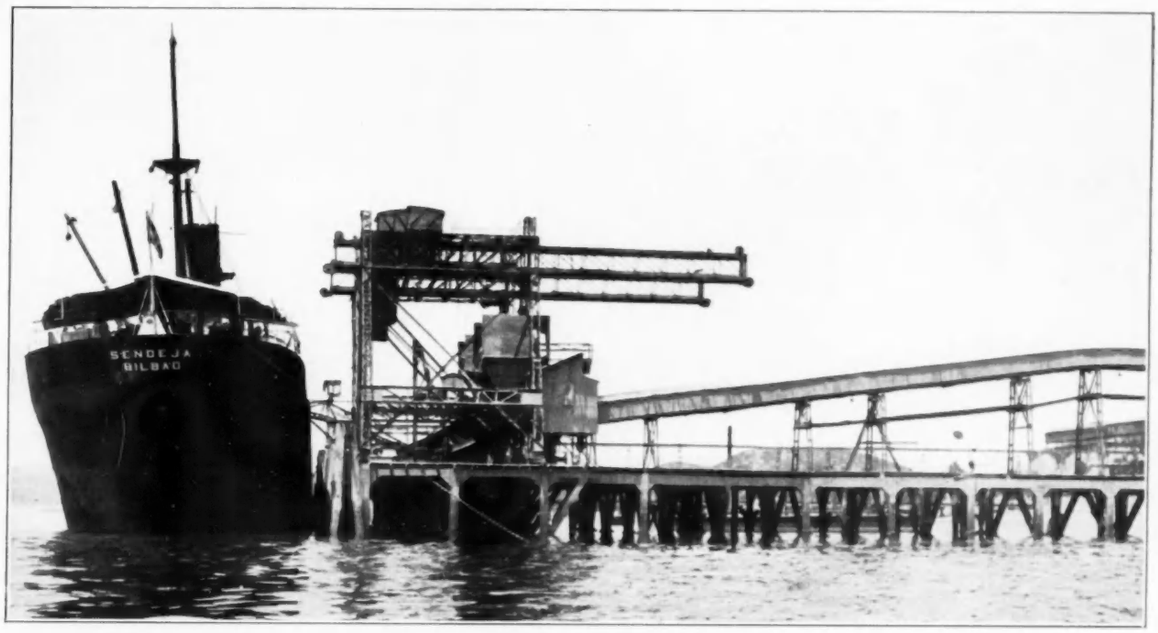
At the eastern end of the fishing harbour, five small landing stages were built for unloading fish, and at the north-western corner a slipway was provided, suitable for the laying-up of ships of up to 300 tons.

In the pleasure harbour, the north side was formed as a quay wall, and on the western side a cleaning ramp and a grounding slope were formed, separated by a small landing stage 2.50 metres (8.2 ft.) wide.

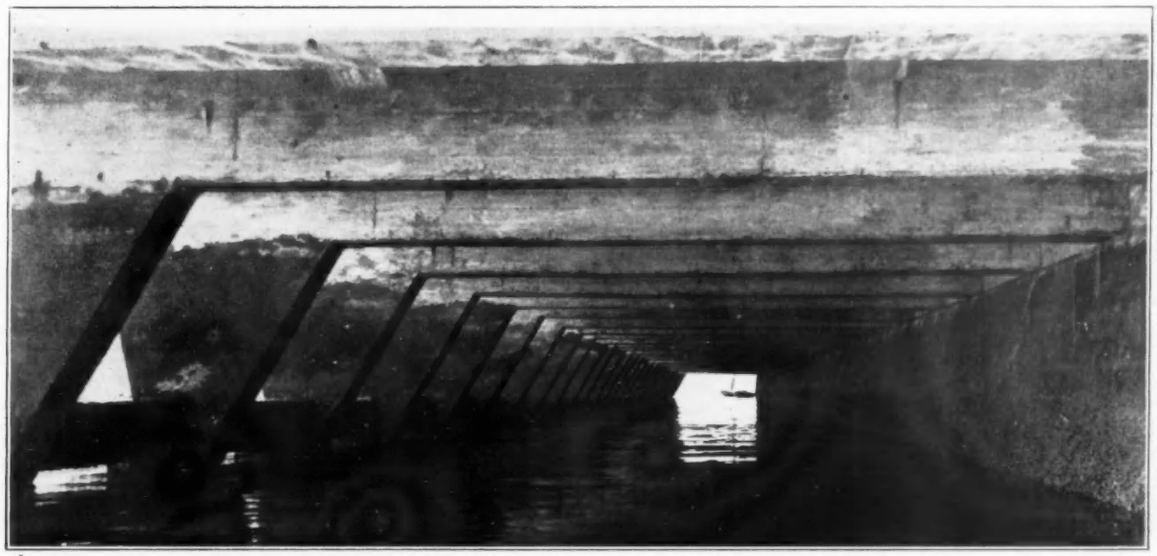
The quay walls, as well as the wharves and glacis, were provided with stairways in stone, concrete or iron, and equipped with bollards and mooring rings.

The number of stone stairs was nine in the river walls and twenty in the glacis. The outer wharf for fishing steamers had two stairs in reinforced concrete, and the inner wharves one stairway each. There were fourteen iron stairways. Of bollards suitable for larger ships there were thirty-four, and for smaller ships one hundred and twenty-eight. The mooring rings numbered one hundred and eight.

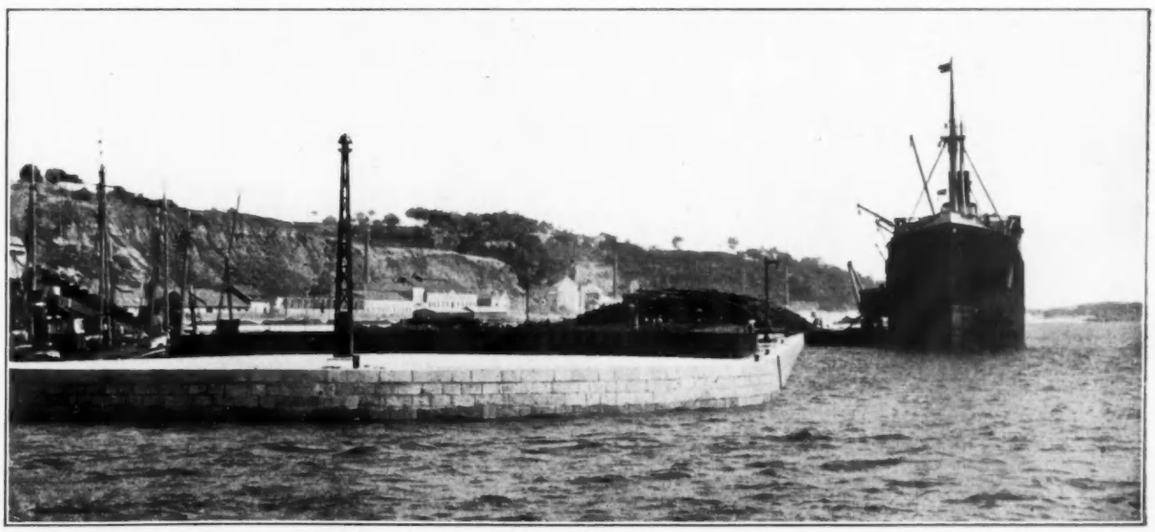
Port of Setubal



Pier utilised for the loading of minerals.



View under one of the new wharves showing the L-beams in position.



Pit props and oil drums stored on one of the new quay walls prior to loading.

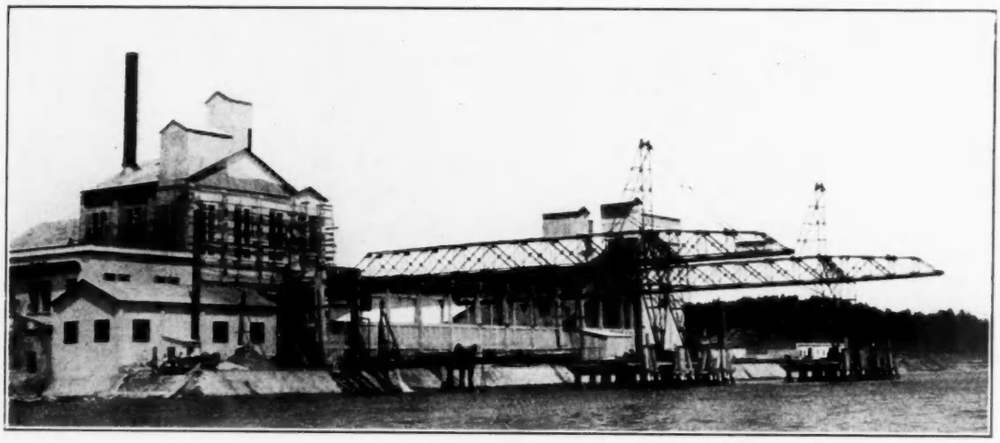
Port of Setubal—continued

The total quantity of cement for the works was about 10,000 tons, of which about 1,800 tons was Belgian cement, the remaining 8,200 tons being Portuguese cement supplied from the works at Outao. The total quantity of steel was 350 tons, and the total quantity of mass concrete and reinforced concrete amounted to about 35,000 cubic metres (46,000 cubic yards).

For shuttering, timbering and stagings, 2,700 cubic metres (100,000 cubic feet) of timber was used, and about 20 tons of explosives were used for blasting the stone in the quarry.

The contractors also undertook the filling of the old dock at Delpeut, which had been condemned by the Harbour Office, and the provision of a quay wall outside this dock, in line with the new works.

This latter structure was formed as a short quay wall, not very thick, but tied to the old dock wall by means of heavy steel tie-rods. The appearance of the wall was the same as the other new walls.



Coal Discharging installation at the SEUR Power Station.

This work as well as the decking over the River Livramento and the demolition of the old works were the subject of a supplementary contract which was awarded to the main contractors, Hojgaard & Schultz.

A further item of the new harbour works was the dredging through the bar of a 1,300 metre (1,400 yards) long channel in order to give access to the port, at all states of the tide, of ships drawing up to 22 ft.

As it was found possible to utilize the sand obtained from this dredging as filling material for the new harbour areas, the Joint Authority also placed this work in the hands of the main contractors, who for this purpose acquired a self-transporting suction dredger of 500 cubic metres (650 cubic yards) capacity. The total quantity to be removed is estimated at 400,000 cubic metres (520,000 cubic yards), of which about 300,000 cubic metres (390,000 cubic yards) have already been dredged.

All these works which had given employment for about 600 men were completed in the beginning of 1934, six months before the time for completion fixed in the contract. The execution of the works had then occupied a little less than 3 years.

The total cost of the works (excluding the dredging of the channel through the bar, which is estimated at one million milreis) amounted to 27 million milreis, but as the contract was based on payment in gold, and the contractors therefore suffered a loss when England abandoned the Gold Standard in September, 1931, a new basis of payments was authorized by the Ministerial Council in February, 1935, and this entailed an additional payment to the contractors of about three and a quarter million milreis.

The first estimate, which was prepared in 1926, amounted to about thirty-two million milreis, so, on the whole, a saving had been effected.

In addition to the deepening of the channel, the necessity of which had long been recognised, other works had to be executed, such as the protection of the bridge at Adoye, which had gradually fallen into disrepair, and also the dredging along the line of the new river wall, of some shoals which might otherwise prove an obstruction for navigation.

The new harbour works will be provided with the necessary equipment for handling ships and their cargoes. The construction of an access road to the fishing harbour has already been put in hand, and roads to the commercial and pleasure harbours will follow. The cost of these works will be about two million milreis.

A large building has been projected to accommodate the services in connection with the sale of, and the preparation, packing and despatch of fish. It will contain two large halls where the taxing of fish will take place; warehousing space for the exporting firms; refrigerating chambers, etc. The estimated cost is 1,400,000 milreis.

The electricity supply and the water supply to the fishing harbour have been completed, and are being installed for the commercial and pleasure harbours.

Railway lines have been constructed and rolling stock provided for the transport of merchandise. At the slipway in the fishing harbour, mechanical equipment for hauling up vessels is being installed.

The needs of the canning industry are being carefully studied, and possibly the Consórcio Português de Conservas de Sardinha will undertake the construction of the necessary buildings and plant.

Special consideration will have to be given to the question of handling materials transported by river craft.

Plans are being prepared for buildings for the various public services, such as a Custom House and an office building for the Harbour Master and the Joint Authority. These buildings will be erected near the Coastal Avenue.

Other work in connection with the accommodation of the superintending service and Naval guard are being contemplated, and also the building of boundary walls not only for the proposed canning establishment, but also round the fishing harbour and commercial harbour. A boundary wall has already been built, by a private firm, round the new coal depot.

With regard to the railway system of the port and the necessary connections to the water front, the building of a new station, Setubal-Mar, has already been commenced on a site near the commercial harbour, and the lines will presently be extended to the quay in this harbour, and later they will be connected to the fishing harbour.

The Joint Authority already possess one steam crane of five to ten tons capacity, erected on one of the wharves, and will shortly acquire other cranes, as well as the floating plant necessary for the upkeep of the port.

The total cost of the equipment of the port is estimated at about seven and a half million milreis, and is to be defrayed out of the Board's revenue.

Movements of the Port.

By virtue of its excellent natural conditions and its geographical position, Setubal has been for a long time an important commercial and maritime centre.

Already in the beginning of the sixteenth century, large quantities of salt were exported from the port, and a considerable inland trade took place in such commodities as wine, timber, hides, honey, oil, wax, vegetables, cloth, etc.

The Setubal salt, which enjoys universal fame, represented up to the middle of the 19th century one of the most important exports from Portugal. The amount of salt exported has been as much as 125,000 moios (about 125,000 tons), representing a value of 600,000 milreis, and carried by 550 ships of many different nationalities.

The annual production of the saltworks at Sado, of which there were about three hundred and eighty at the close of the eighteenth century, exceeded 226,000 moios (about 226,000 tons) and gave employment to about 2,000 workers.

In addition to this important salt trade, Setubal had also large exports of wine, cork and oranges, the figures for the year 1875 being 10,500 litres of wine, 1,250 tons of cork, and more than 800,000 oranges.

Port of Setubal

Aerial view of the new harbour for fishing vessels.

Aerial view of the Commercial Harbour.

Port of Setubal—continued

*The port has, furthermore, always possessed a very important fishing industry, which even to-day represents the livelihood and occupation of a large portion of its population.

This industry has gone through many vicissitudes, but all old annals relating to Setubal show that the population have always considered it one of their most important duties to preserve the fisheries, and defend the interests of the fishing population, and to provide the means of assisting and developing the industry.

At the end of the eighteenth century, the annual value of the fisheries was estimated at 16,000 to 19,000 milreis, whereas the value at the middle of the nineteenth century was about 100,000 milreis.

In the beginning of the present century, the value of the fishing reached 600,000 milreis per annum, and the industry employed over 500 vessels with about 3,000 hands.

The world war caused a considerable growth of the industry. Thus, in 1917, the number of vessels was over 800 with about 4,000 hands, and a turnover exceeding two million milreis, while in 1923 the figures were 659 vessels employing 5,253 men, and the turnover 50 million milreis.

At the present time, the number of fishermen still exceeds 3,000. There are 587 vessels of which 78 are motor boats, and the quantity and value of fish for the years 1928-1934 and the first six months of 1935 were as follows:

YEAR	Sardines		Other kinds		Total	
	Quantity in Tons	Value in 1,000 Milreis	Quantity in Tons	Value in 1,000 Milreis	Quantity in Tons	Value in 1,000 Milreis
1928 ...	20,531	33,817	1,023	2,996	21,554	36,813
1929 ...	19,887	38,828	4,311	6,901	24,198	45,729
1930 ...	16,268	19,112	1,629	10,756	17,897	29,868
1931 ...	16,062	11,814	1,817	1,922	17,879	13,736
1932 ...	14,876	15,638	1,686	2,423	16,562	18,061
1933 ...	15,901	15,580	1,780	2,538	17,681	18,118
1934 ...	20,122	20,585	1,746	2,843	21,868	23,428
1935 Jan./June	3,448	3,528	1,000	1,577	4,448	5,105

As a fishing harbour, Setubal occupies the second place of the ports of Portugal, chiefly on account of its sardine fisheries, which furnish the raw material for its principal industry, namely, the canning of fish.

Originally the sardines were cured in salt and pressed, and in this form they constituted for many years an important export product.

In 1872, the first factory for preserving the sardines in oil was built in Setubal, and was soon followed by many others. During the war, when the sale of tinned food was enormously increased, the number of factories at Setubal grew from eighty to one hundred and sixty. Owing to circumstances, most of them have disappeared again, and the total number of factories actually working is now only sixty-four.

The export from Setubal of canned fish, which in 1925 reached about 20,000 tons, representing a value of over sixty-five million milreis, has since been subject to great fluctuations. The lowest point was reached in 1927, when the tonnage went down to about 12,000, but in any year the export from this port has represented about 50 per cent. of the total export of canned fish from Portugal.

As will be seen from the following table, the largest importer of fish from Setubal is France, and thereafter comes Germany, Belgium, England, Italy and the United States of America.

The shipping of cork, which formerly was an important function of the port, has since been transferred to Barreio, Montijo, Seixal a.o., and yet, during the last six years, several thousands of tons have been exported from Setubal, and in the future it will again become an important centre of this trade.

The imports consist chiefly of coal, and thereafter the raw materials for the canning industries such as tinplate, oil, tin and lead, which goods, although not representing a very great tonnage, are yet of considerable value in money.

Since 1927 a considerable import of phosphates has taken place for the super-phosphate industry, the quantity having reached about 40,000 tons per annum, to a value of over four and a half million milreis.

A summary of imports and exports for the year 1923 to 1934 and the first six months of 1935 is given in the accompanying table:—

Year	Imports		Exports		Total	
	Quantity in Tons	Value in 1,000 Milreis	Quantity in Tons	Value in 1,000 Milreis	Quantity in Tons	Value in 1,000 Milreis
1923	8,100	15,030	47,200	54,495	55,300	69,525
1924	16,700	29,850	48,800	75,500	65,500	105,350
1925	17,250	22,180	35,800	68,760	53,050	90,940
1926	14,930	20,550	34,512	64,759	49,462	85,309
1927	27,158	28,188	98,476	42,085	125,634	70,273
1928	60,618	25,447	109,783	82,567	170,401	108,014
1929	78,219	38,589	152,213	105,602	230,432	144,191
1930	71,739	35,003	208,091	81,232	279,830	116,235
1931	65,883	31,742	127,249	80,875	193,132	112,617
1932	65,093	29,233	155,220	68,963	220,313	98,196
1933	62,368	28,315	150,642	48,713	213,010	77,028
1934	76,641	46,688	162,644	66,972	239,285	113,660
1935 Jan./Jun	42,160	16,035	41,640	30,404	83,860	46,439

A classification of the goods imported and exported is given in Tables 1 and 2 on the opposite page.

In addition to overseas trade, the port has a large amount of coastal traffic in such goods as agricultural produce from Alentejo, including grain, vegetables and charcoal, and also cement from the works at Outao and other building materials such as stone and timber. The quantity of goods handled by the port in these ways is approximately 30,000 tons per annum.

A large number of ships is registered in this port, both fishing craft and coastal vessels, as indicated by the following table which shows the ships registered at Setubal at December, 1933.

Ships	Number
Merchant ...	16
Fishing ...	930
Coastal ...	192
Special Services ...	153
Total ...	1,291

The Port of Setubal has also had great importance in the building of warships. Together with Viana do Castelo, Oporto, Aveiro and Lisbon it took part in the equipment of the armed fleets which, in the fifteenth and sixteenth centuries, were responsible for the famous Portuguese discoveries and overseas conquests.

EXPORTS OF TINNED FISH FROM SETUBAL, GIVING THE COUNTRIES OF DESTINATION, FROM 1928 TO 1933.

Country of Destination	1928		1929		1930		1931		1932		1933	
	Cases	Tons	Cases	Tons	Cases	Tons	Cases	Tons	Cases	Tons	Cases	Tons
Germany	202,424	4,435	234,706	5,023	129,394	1,795	184,714	3,729	201,774	4,123	190,547	3,208
Belgium	57,645	57,306	90,508	1,996	72,457	1,521	88,277	1,857	71,525	1,554	87,925	1,623
Denmark	162	5	3,164	83	1,213	26	3,528	90	1,107	29	958	19
Egypt	20,561	486	8,662	214	6,070	148	6,317	151	1,608	39	3,901	80
Spain	—	—	90	1	41	1	556	12	—	—	1,000	21
U.S.A.	23,349	795	37,156	1,047	24,529	619	43,565	1,236	71,348	2,081	40,530	971
France	365,479	8,934	372,305	9,476	336,258	5,654	512,717	11,715	263,412	8,628	182,951	3,534
Greece	1,366	37	7,335	245	5,305	129	3,673	91	545	14	80	1
Holland	8,102	174	10,041	222	10,720	225	8,879	161	10,215	209	4,346	69
British Empire... ...	32,845	866	64,649	1,445	56,964	1,400	62,478	1,564	59,888	1,575	22,434	580
Italy	64,552	1,845	56,944	1,316	54 298	1,393	26,509	623	22,639	541	30,056	756
Turkey	2,609	62	2,894	65	181	6	228	6	534	14	100	1
Other Countries ...	—	—	21,335	437	14,806	305	12,519	305	15,471	360	18,613	362

From 1925 to 1928 a Norwegian concern operated at Troia a plant for extracting whale oil in conjunction with a manure factory, and during this period some hundred whales were caught off the coast of Portugal and about 2,400 tons of oil were exported.

The export of ore is also of importance, and reached 182,840 tons in 1930.

In 1933 the export of pit props was started, and the quantity handled up to March, 1934, amounted to 15,000 tons.

At the present time, shipbuilding is only carried out on a small scale, the total number constructed during the last six years being 195, with a gross tonnage of 480 tons.

The traffic of the port has increased during the last years, not in the number of ships but in gross tonnage. The decrease in numbers is due to the decrease in the number of sailing ships, which has amounted to some hundreds during the last thirty years, while during the same period, the number of steam ships has been doubled.

Port of Setubal—continued

TABLE 1. PRINCIPAL IMPORTS AT SETUBAL IN THE YEARS 1923 TO 1933.

Year	GOODS							
	Tinplate		Tin and Lead		Coal		Oil	
	Quantity in Tons	Value in 1,000 Milreis	Quantity in Tons	Value in 1,000 Milreis	Quantity in Tons	Value in 1,000 Milreis	Quantity in Tons	Value in 1,000 Milreis
1923	2,697	7,517	385	1,749	6,893	719	389	2,723
1924	4,932	19,487	385	4,387	10,101	1,759	277	3,284
1925	4,293	10,179	206	2,441	11,397	1,538	292	2,298
1926	4,259	10,770	179	2,154	3,691	573	281	2,268
1927	4,382	9,924	902	4,619	13,035	1,680	640	6,551
1928	5,425	12,330	240	2,451	16,518	1,796	123	858
1929	6,567	16,417	202	3,262	24,000	3,828	525	3,310
1930	4,924	10,026	133	1,185	20,977	2,577	1,488	6,859
1931	7,114	12,405	109	795	22,326	2,877	998	4,792
1932	6,283	11,610	117	787	15,433	1,972	648	3,747
1933	5,086	9,915	92	872	40,941	5,246	832	4,417

TABLE 2. PRINCIPAL EXPORTS AT SETUBAL IN THE YEARS 1923 TO 1933.

Year	GOODS							
	Canned Goods		Salt		Minerals		Cork	
	Quantity in Tons	Value in 1,000 Milreis	Quantity in Tons	Value in 1,000 Milreis	Quantity in Tons	Value in 1,000 Milreis	Quantity in Tons	Value in 1,000 Milreis
1923	12,891	47,803	30,512	762	—	—	400	290
1924	16,407	68,425	30,446	761	—	—	300	320
1925	19,492	65,009	9,406	217	—	—	—	—
1926	18,174	60,412	10,964	473	—	—	—	—
1927	10,059	30,023	14,946	338	66,162	1,334	19	16
1928	13,290	57,813	9,414	254	77,713	3,132	2,339	1,404
1929	18,259	89,278	5,112	332	89,278	4,910	2,330	1,730
1930	14,198	65,850	2,657	247	182,840	9,839	242	305
1931	18,408	71,280	4,638	199	96,723	5,000	1,506	598
1932	16,646	60,129	14,909	480	93,807	4,571	1,986	831
1933	11,225	40,245	36,764	776	97,407	4,747	199	83

The steamers and sailing ships entering the port in the years 1923 to 1934 and the first six months of 1935, have been as follows:—

Year	Steamers		Sailing Ships		Total	
	Number	Gross Tonnage	Number	Gross Tonnage	Number	Gross Tonnage
1923	255	167,751	370	42,439	625	210,190
1924	298	260,179	298	29,986	596	290,165
1925	276	277,968	267	24,962	543	302,930
1926	302	286,870	322	15,666	624	302,536
1927	295	327,831	276	31,205	571	359,036
1928	389	416,622	270	36,793	659	453,415
1929	440	492,308	247	40,996	687	533,304
1930	448	530,372	264	41,580	712	571,952
1931	403	536,496	239	39,215	642	575,711
1932	353	458,907	240	47,221	593	506,128
1933	345	468,987	255	46,960	600	515,947
1934	397	562,417	271	41,952	668	604,369
1935 Jan./Jun.	153	219,110	112	16,396	265	235,506

The nationality of ships calling at this port is naturally mainly Portuguese, and thereafter in order of gross tonnage: German, English, Italian and Norwegian.

The table below gives details of nationality, numbers and tonnage of ships during 1928 to 1933:—

SHIPS ENTERING THE PORT OF SETUBAL IN THE YEARS 1928 TO 1933, CLASSIFIED ACCORDING TO NATIONALITY.

Nationality	1928		1929		1930		1931		1932		1933	
	Number	Tons	Number	Tons	Number	Tons	Number	Tons	Number	Tons	Number	Tons
German	65	114,777	62	116,155	70	126,555	64	118,390	74	117,274	69	111,900
Austrian	—	—	—	—	—	—	1	2,792	2	4,973	2	2,738
Belgian	—	—	—	—	3	6,162	—	—	—	—	3	4,659
Danish	15	7,502	27	33,277	17	25,075	6	6,029	3	4,167	10	8,430
Spanish	8	8,809	10	3,271	6	3,469	11	8,849	14	12,489	4	8,263
Esthonian	1	336	—	—	1	1,251	2	2,854	—	—	1	1,251
Finnish	—	—	1	1,421	2	2,587	—	—	—	38,653	1	1,575
French	4	819	6	2,370	1	67	33	59,376	29	—	28	37,472
Greek	1	1,406	—	—	3	2,844	—	—	—	—	—	—
Dutch	3	3,607	—	—	10	4,495	14	4,458	12	15,678	30	27,466
English	55	72,622	71	105,341	73	126,183	76	115,426	73	107,407	75	110,417
Italian	33	58,854	30	51,917	28	49,786	28	50,001	26	48,617	24	44,533
Norwegian	63	62,181	80	83,639	69	73,788	58	59,960	58	66,284	49	53,012
Portuguese	411	122,502	395	118,604	424	140,853	348	145,070	300	77,113	298	84,015
Swedish	—	—	5	7,704	5	8,837	2	2,506	2	3,473	6	10,216
	659	453,415	687	523,699	712	571,952	643	575,711	593	496,128	600	505,947

Various shipping companies, mainly Portuguese, send regular steamers to Setubal, for instance: Açoreana de Navegaçao, Atlântica de Navegaçao Ltd., Colonial de Navegaçao, National de Navegaçao, Carregadores Açoreanos, and the Sociedade Geral de Comercio Industriae Transportes; and of foreign companies: Compagnie Nantaise de Navigation à Vapeur, of Nantes; Dampfschiffahrts-Gesellschaft "Neptun" and Deutsche Dampfschiffahrts Gesellschaft of Bremen, Deutsche Levante and Orient Dienst of Hamburg, Ellerman and Papagamis Lines, Ltd., of Liverpool; Isaac's Line—M. Isaac's and Sons Ltd., and John Hall, Jnr., and Co., of London; Koninklijke N.S.M. of Amsterdam; Linea Italo-Iberica, of Barcelona; London and Edinburgh Steamship Company, Ltd., of Leith; MacAndrews and Co., Ltd., of Liverpool; "Neptunia" Società Anonima di Navigazione, of Génoa; Oldenburg-Portugiesische Dampschiffs-Rhederei, of Oldenburg; Rob. M. Sloman Jrs., of Hamburg; Standard Line, of Oslo and Turner, Edwards and Co., of Bristol.

The Future of the Port.

It is very seldom that one finds collected in one place all the conditions favourable for the building of a great harbour such as is the case at Setubal. With the exception of Lisbon, Setubal is that of the Portuguese ports which possesses the best natural conditions as regards shelter, access and anchorage space.

Compared with other ports of the country, it has a vast hinterland, in so much as it forms the natural outlet for the mineral products of one of the largest and richest provinces, Alentejo. And on both sides of the River Sado there are large undeveloped tracts, suitable for the establishment of some of the large industries which the country needs.

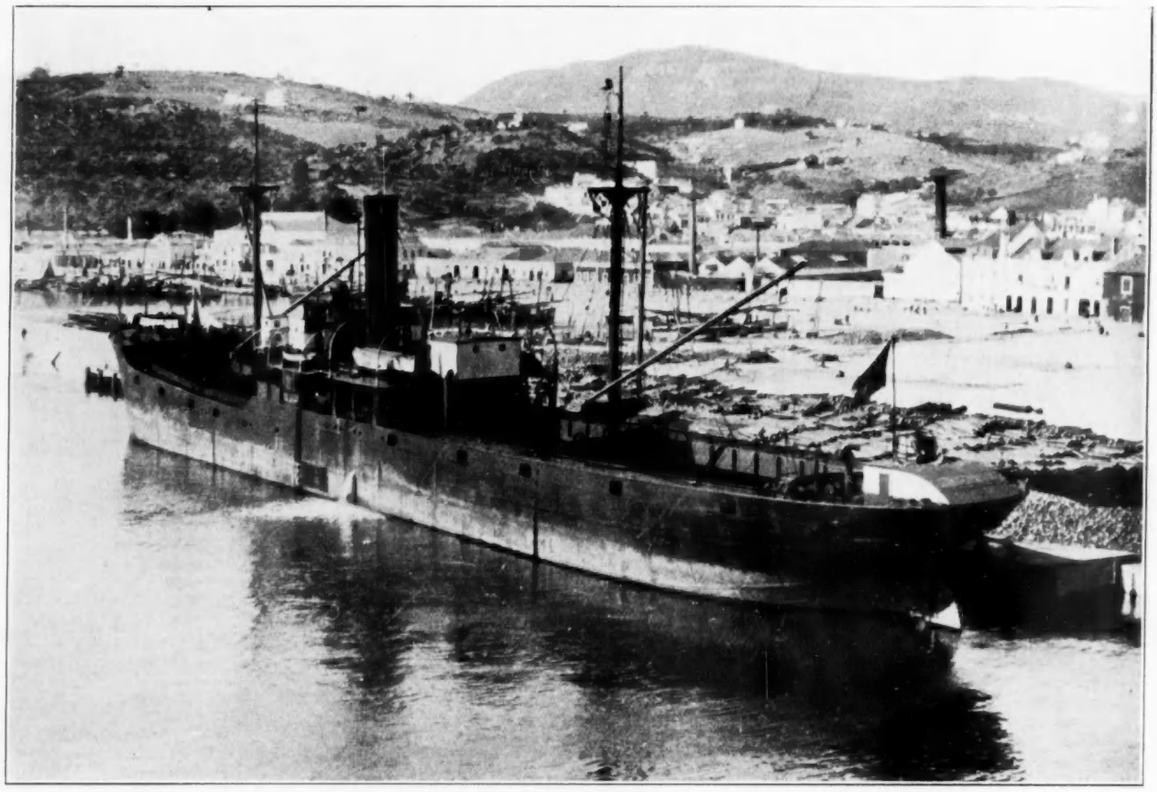
Situated near a coast which abounds in all sorts of fish, and with a population who have been fishermen for generations, Setubal has become a fishing centre of the first order.

Destined through its geographical position to serve a rich and productive region, with large possibilities for development, and with its industrial and commercial traditions, Setubal will be assured a prominent position amongst similar ports.

By virtue of its volume of exports, imports and coastal trade, it now occupies the third place of the ports of the country, and it can therefore play a prominent part in the prosperity of the district and the country as a whole.

The River Sado serves Setubal as an excellent waterway. It is navigable for about 65 kilometres (40 miles) inland by ships of medium tonnage, and with no great difficulty it could be

Port of Setubal



Steamer taking in a cargo of pit props.

General view of the port on completion of the new works.

Port of Setubal—continued

improved to allow ships of greater draught to proceed right up to Alcacer.

But the port is also well served by roads and railways connecting it both with the surrounding district and with the main lines to Evora and Beja.

In addition to the railway line to Barreiro and the connections to the central district of Alentejo, a new railway has been in operation since 1926, connecting Setubal with the Sado Valley

The projected cross-country lines between Casa Branca—Alcácer and Alcácer—Vendas Novas, between the South and South Eastern main lines (which could also be connected by a shorter line through Fonte) will greatly facilitate the communications with the eastern part of Alentejo, and finally if the projected railway from Zafra to Reguengos is built, Setubal may become the export harbour for minerals from some of the Spanish districts which have no other connection to the coast.

Of the roads leading to and from Setubal, the most important is the international highway which from Cacilhas runs through Setubal, Montemor-o-Novo, Elvas and Badajoz to Madrid and Seville, which road at Montemor joins the main road going through Evora to Mourao and Seville, and which also, via Alcácer do Sal, leads through Ferreia and Aljustrel to Algarve, connecting at Ferreira with the road to Beja.

There is also a road via Ficalho to Seville and, at Alcacer the road via Grândola to Santiago do Cacém and Sines, which at Santiago do Cacem connects to the road that goes to Cercal and Odemira and further on to the province of Algarve.

Other secondary roads connect the port with the neighbouring districts, and in addition to these a new road is now being constructed from Setubal through the old fort of Outao to Azeitao in Arrabida, and incidentally, this is going to be one of the most beautifully situated roads in the country.

The future importance of Setubal as a commercial port will not depend solely on the trade in local products such as wine, cork, salt, timber, cement, etc., but also on the trade in fruit, corn and vegetables produced in the whole of the Sado valley. A large irrigation scheme is under consideration, and it is expected that the agricultural production in the Sado valley will be considerably increased, and here again Setubal is the natural outlet both for internal consumption (by river and coastal vessels) and for export.

The situation of the port in relation to the larger mining centres in Alentejo also points to its being the natural shipping place for these industries (except those which are served by the river Guadiana, or by projected railways to the ports of Algarve).

At Setubal, elaborate apparatus have been installed for the loading of pyrite from the mines at Aljustrel and Louzal.

Two T-shaped deep water jetties have been built, and equipped with conveyors and loading plant capable of dealing with an annual output of 300,000 tons. Large bins are available for storing the pyrite, and crushing and screening plants have also been installed.

Another concern, who own the mines at Ourada, have acquired a large piece of land close to this port, for storing and loading minerals.

The efficient working of the coal mines at Santa Susana might also result in a considerable increase in the traffic of the port.

As an industrial centre, Setubal is particularly favourably placed, perhaps as no other port in the country. It has excellent communication and transport facilities, and a good depth of water; it is close to the largest consuming centre in the country, it possesses extensive areas in the vicinity of the harbour and has a large working population, and it also offers an opportunity of obtaining electric power at a low cost.

All these conditions are favourable for the establishment of industrial undertakings, and it is quite possible that within a few decades Setubal will have developed into an important industrial centre.

The canning factories at present operating in the port employ over 5,000 persons, not counting those engaged in fishing. The value of raw materials imported by these factories amounts to one hundred million milreis annually. The annual output is over 500,000 cases of tinned fish representing a weight of 10,000 tons. These products are well known everywhere and enjoy the highest reputation.

Another great industry, which was founded in 1928, is a factory for chemical manure, owned by Sociedade de Adubos and Produtos Quimcos (S.A.P.E.C.), which is connected with the export of pyrite from Aljustrel and Louzal. In addition to sulphuric acid plants and super-phosphate works with an annual output of 100,000 tons, they own a sack factory, and various laboratories, depots, warehouses and residential quarters for engineers and other employees, and a piece of land of about 200 ha. (about 300 acres) intended for future developments.

In 1930, an important thermo-electrical plant was put into commission, principally in order to supply power for the town and for the electric furnaces of a carbide factory. It now belongs to the Society for Urban and Rural Electrification (S.E.U.R.), who propose to supply electricity to the outlying districts and who, to that end, intend installing an 8,000 k.w. generator.

The discharge of coal for this station takes place on two of the reinforced concrete wharves, which are equipped with transporters.

Another of the industries of the port is the old-established cement works near Outao. These works have been modernised by the installation of two new rotary kilns with an annual output of about 60,000 tons, and by the provision of up-to-date facilities for the loading of cement and unloading of coal.

In the town itself there are various smaller industries, the most important being flour mills and terra-cotta works.

As a fishing port, Setubal possesses, as already mentioned, not only a coast rich in fish, and a population of traditional fishermen, but it also has all the essentials for the establishment of a large fishing harbour, namely a sheltered position, good anchorage, quick communications with the hinterland, large areas available for industries, drying of nets, and also supplies of fresh water, oil, coal, ice and all other provisions necessary for fishing boats.

At the present time, eighty-five per cent. of the value of fish brought into the port is represented by sardines, which is the only fish that fetches a reasonable price from the canning firms; but, with its excellent facilities, this port could gain further importance as a fishing port by the creation of a large market for fresh fish to be supplied to the inland population and even to Lisbon.

Setubal would serve very well as a naval port on account of its favourable conditions for the establishment of a base, such as has been suggested at Troia, where the Portuguese Fleet has frequently held manœuvres.

The proximity to Lisbon and the possibility of connecting the two harbours by a canal (already proposed over one hundred years ago) are other advantages worthy of consideration in this connection.

Finally, as a pleasure resort, Setubal should have a great attraction because of its calm bay, which is eminently suited for aquatic sports; its mild climate and its picturesque shores, which extend on the left along the whole length of Troia Sandbank, and on the right fram Albarquel to Arrabida, and on account of the beauty of its landscape, which is praised by natives and foreigners alike.

When the port has been furnished with the necessary equipment for its traffic, and the new railways into the hinterland have been completed, the navigability of the river Sado improved and the projected irrigation works executed; then—given a sound and intelligent administration, together with an inducement to the mines to increase their production, the granting of facilities for the establishment of new industries, the protection of the fisheries, an intense propaganda for the consumption of fresh fish, the development of the coastal trade, and the improvement of Portuguese relations both with their colonies and other countries—then, Setubal will become a weighty factor in the economical life of Portugal.

Weser Inland Shipping in June, 1935.

In June, 1935, water conditions on the Weser deteriorated further and necessitated a further lightening of barges, both on the Upper and Middle Weser. Goods carried amounted to only 53 per cent. of the amount carried in the previous month.

During the first half of the year 1935, water conditions on the Weser were on the whole more favourable than during the same period of the last three years. On the Upper Weser from Munden, Hanover, it was possible to load barges to their full capacity on 80 days, compared with 15, 36 and 51 days respectively during the first half of the three previous years. On the Middle Weser full loading was possible on 107 days, compared with 37, 55 and 92 days during the same period of the three previous years.

Due to the bad water conditions, goods traffic downstream through the Bremen Weser Lock was less than during May, 1935. 124,000 tons arrived. That is 18,600 tons or 13 per cent. less than in the previous month. By far the greater part of this loss falls to potash and salt, which decreased from 29,000 tons to 14,000 tons. Only coals showed a slight increase. Upstream traffic, at 43,700 tons, was practically the same as in the previous month. In both directions together 167,700 tons passed through the lock, compared with 186,500 tons in May, that is 18,800 tons, or 10 per cent. less.

During the first half of 1935 altogether 958,100 tons passed through the Bremen Weser Lock, compared with 760,300 tons during the same period of the previous year. This is an increase of 197,800 tons, or 26 per cent. Downstream traffic, at 702,500 tons, increased by 162,000 tons, or 30 per cent.

The Development of Quay Wall Construction at Rotterdam, Holland

By W. F. van DIJCK, Engineer in the Docks Division of the Works Department, Rotterdam

(continued from page 328)

Tide Work.

Upon one occasion a reinforced concrete floor was successfully made, without the use of the diving-bell (Fig. 16). After the piles had been driven in, a deposit of sand was made reaching to the level of the bottom of the floor and afterwards a building pit, or cofferdam, was formed of sheet-piling to exclude the water. After the completion of the wall the sheet-piling was removed and the sand underneath the floor dredged off.

By placing the timber floor some decimetres above low water, it was also possible to make this without using the diving-bell and without forming a separate cofferdam†.

Of course, an objection to this " tide work " is that regularly, with the rising of the tide, the work has to be left, and frequently work has to be done outside the ordinary working hours.

Sheet Piling.

As stated in the foregoing, limitation of the width of the floor may be effected by the introduction of a fascine dyke; that limitation, however, can be attained alternatively by the application of sheet-piling. At Rotterdam several quay walls have been constructed with the employment of sheet-piling. An example of such construction is shown in Fig. 17. A quay wall according to that profile was recently constructed along the west side of the Binnenhaven, to replace the old wall (Fig. 9) which was in such a tumble-down condition that a decision had to be taken to proceed with its demolition.

In view of the great resistance to bending which the sheet-piling must possess and further in view of the obstacles to be met with in the soil (remnants of the previous wall) sheet-piling of steel was adopted.

The curious distribution and position of the piles in this form of construction present some difficulty as regards the determination of the forces which will come into play. These arise from the weight of the floor and of the wall resting thereon, the sand filling and any loading of the wharf with merchandise, as well as the forward pressure which the filling exerts upon the wall and the sheet-piling. These factors called for special methods of calculation.

the support of a box-shaped structure of reinforced concrete. On the land side, the box was given a bearing upon a section of the old wall that had remained intact. The boxes or caissons of reinforced concrete were given a length of 40 metres with a breadth of 10 metres (about 130 by 33 ft.). They were built up in a floating dock to such a height that they had no greater draught afloat than 1 metre, so that at high tide they were able to float above the foundation that had been prepared, and on the ebb of the tide they came to rest upon this prepared bed. Afterwards they were further built up in situ.

"Rotterdam" Type.

The well-known Rotterdam quay-wall construction with caissons of reinforced concrete evolved from the working method described, has found imitation in numbers of foreign ports.

Considering that the Rotterdam soil is not suitable for the resting of a foundation directly thereon, the application of caissons has, of necessity, to be accompanied by an improvement of the soil.

Sand Bed.

On the site where a quay wall has to be constructed, the soft upper stratum is dredged till the firm sandy soil is reached, and is replaced by clean coarse sand. The sand is dredged in the river before the town and conveyed by means of hopper barges, which discharge their cargoes under water by opening their bottom doors.

To compress and compact the sand in this ground improvement trench, a load of sandy gravel is introduced thereon, reaching to from 5 to 6 metres above R.L. The sand in the trench is subjected to the weight of the gravel dyke for from three to four months. The gravel dyke is afterwards removed and the place where the caisson is to be put is dredged as flat and as accurately as possible, and to the required depth. The caisson that has been constructed in the meantime is floated to the spot and sunk by means of water ballast. The caisson is then filled with sand or concrete, simultaneously the filling with sand at the back is effected. The further construction of

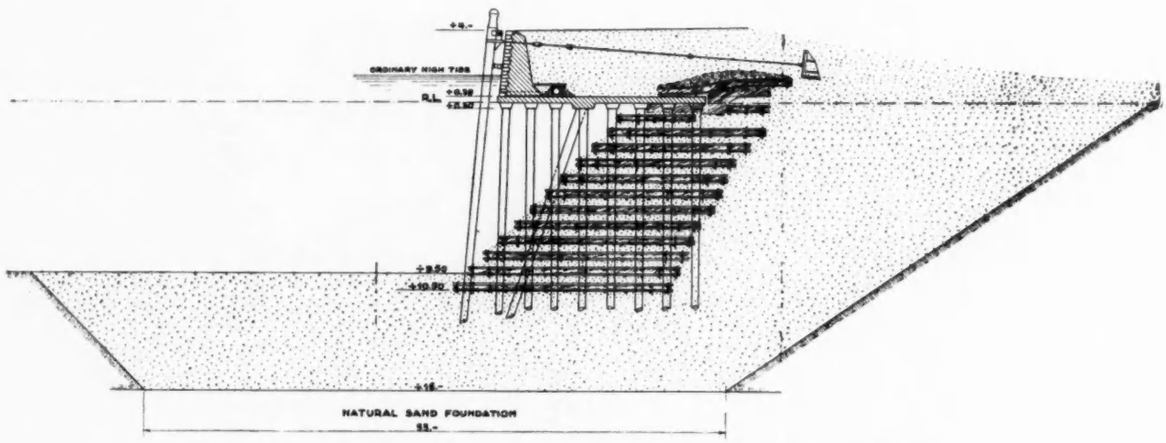


Fig. 16. Quay Wall at Waal Dock, N.W. Side. Year of Construction 1921.

Spoorhaven Quay.

In 1905 it became necessary to make provision for dealing with the extremely tumble-down condition of the quay wall along the east side of the Spoorhaven (Fig. 10). The arrangement that was effected is shown in Fig. 18. In front of the old quay wall, heavy piles were driven which might serve for

the wall upon the caisson is effected in just the same way as was described in the foregoing for the construction of quay walls upon pile foundations.

To relieve the quay wall, as far as possible, from the forward pressure which would result from any difference between the level of the ground water behind the wall and that of the open water in front of the wall, drainage is introduced. The drainage consists of perforated pipes of reinforced concrete, covered over with successive layers of gravel and shingle. By means of discharge pipes, the main drainage is in connection with the open basin water. The discharge pipes are provided with a ball-valve box, in which, when the water outside rises, the outlet is closed, so that it is unable to penetrate into the drainage pipe (Fig. 20).

† As is well known, timber is practically imperishable, provided it remains continually below water. Experience at Rotterdam has shown that timber is not perishable below a level of 0.70 metres above R.L., i.e., midway between high and low tide. Nevertheless, it is preferable not to allow the piles to stand so high, because of the danger of mechanical injury by ice when frost sets in.

Quay Wall Construction at Rotterdam

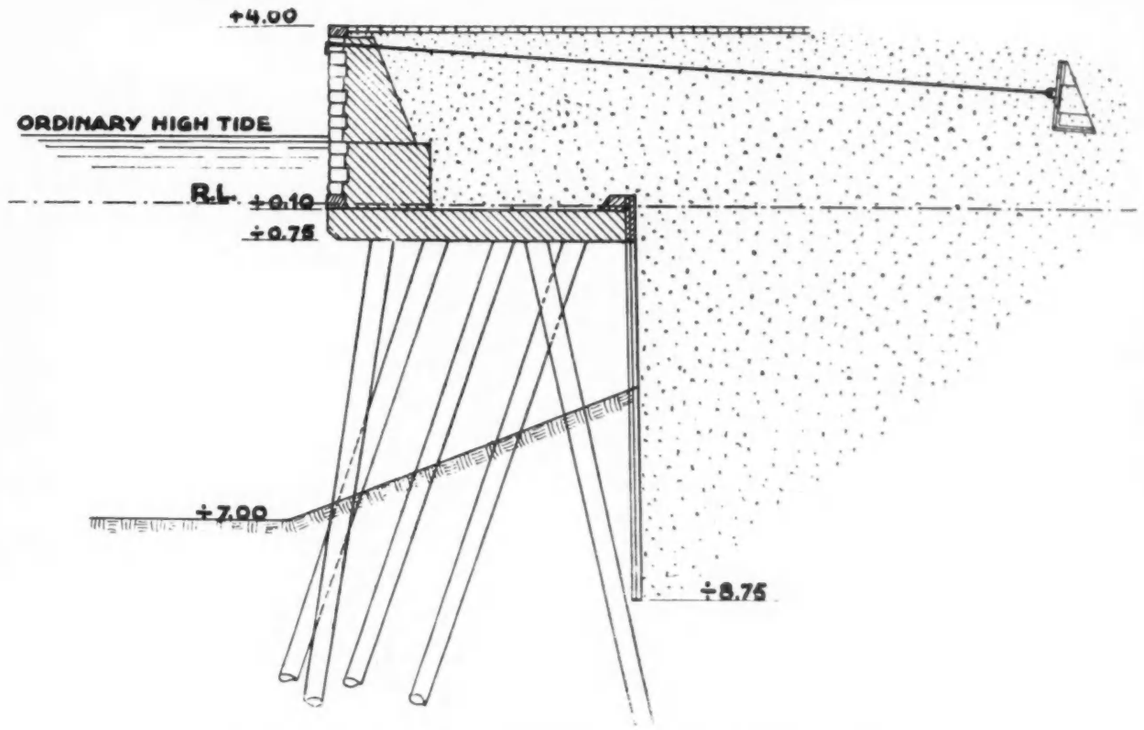


Fig. 17. Quay Wall along Binnenhaven (Interior Dock) West Side.

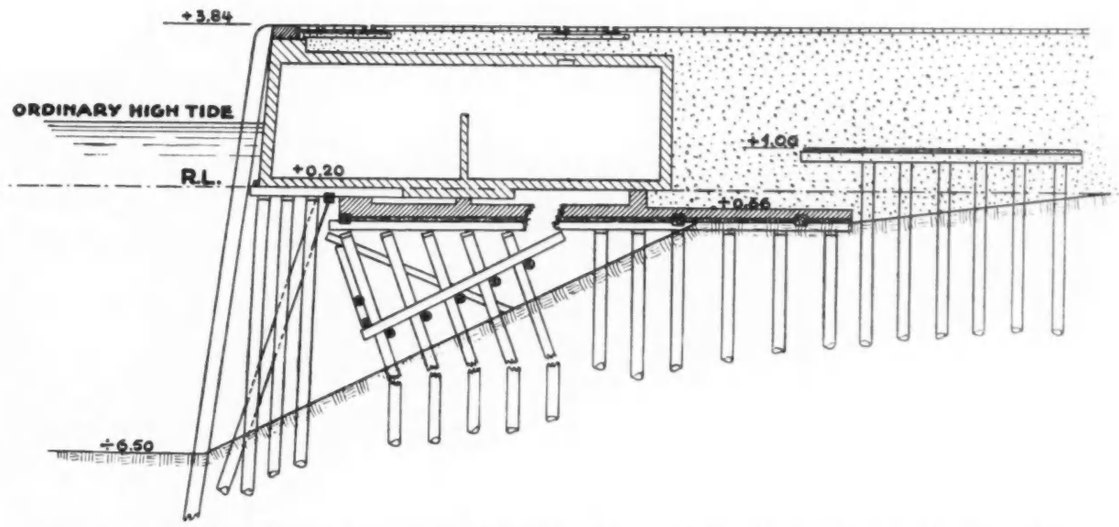


Fig. 18. Quay Wall along Spoorweghaven (Railway Dock) East Side. Years of Construction 1905-1906.

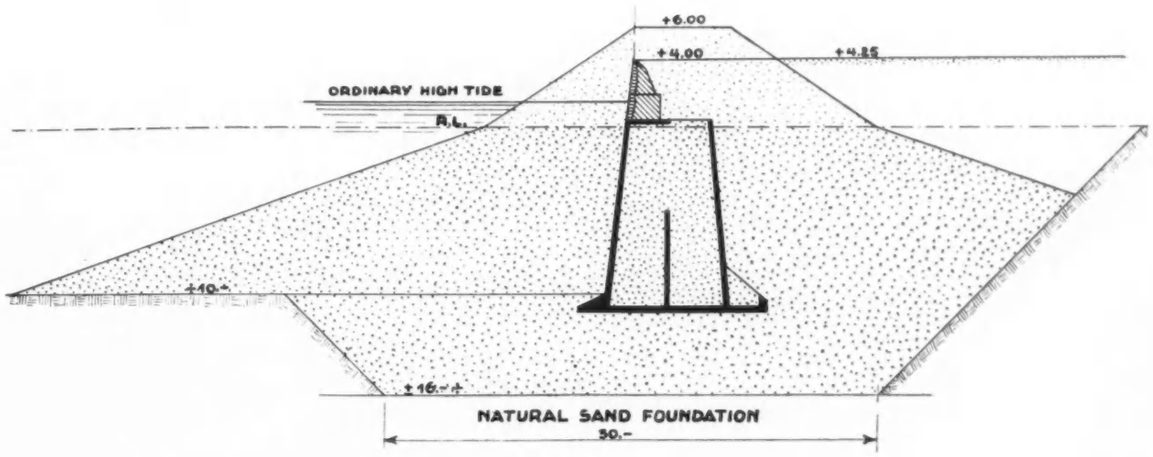


Fig. 19. Ground Improvement.

Quay Wall Construction at Rotterdam—continued

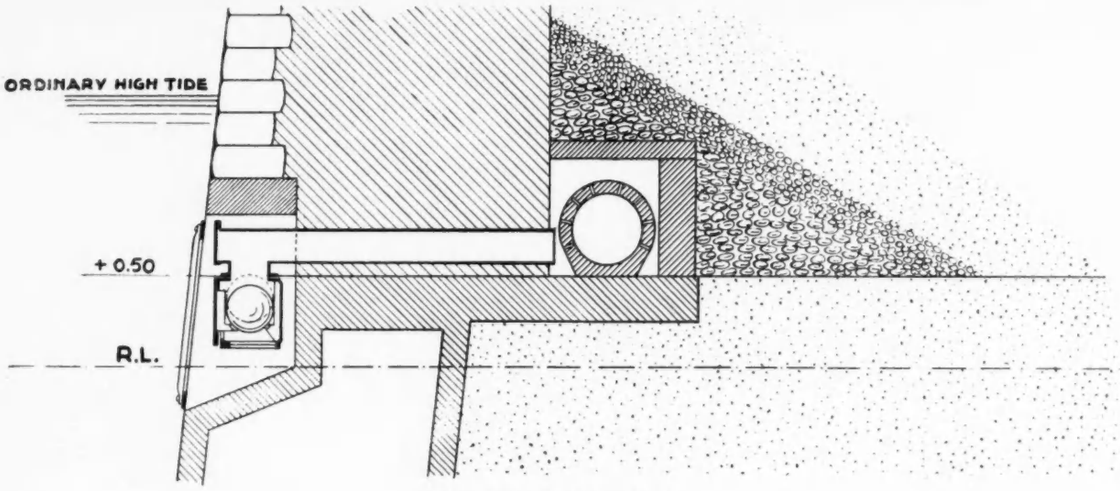


Fig. 20. Draining Outlet.

The expense of the above-described ground improvement, as is to be observed from inspection of Fig. 19, forms a considerable part of the total cost of quay-wall construction. The question has consequently arisen from time to time, when economic conditions compel economies, whether it must be regarded as definitely necessary to continue to pursue this costly method of working.

At first the filling up behind the wall with sand above the level of 1 metre below R.L. and over a breadth of ground of 60 metres was effected by means of transporting elevators; pumping was not considered advisable. A trial made with pumping, confined to a strip of ground situated between 20 and 60 metres behind the front of the quay wall, was crowned with success, however, and the wall withstood this without damage. In this way a first economy was achieved.

Merwehaven Quays.

For the quay-wall construction in the Merwehaven series (Fig. 1) which was completed at the beginning of 1932, the preliminary loading with sand in the process of ground improvement has been omitted, by which means a second con-

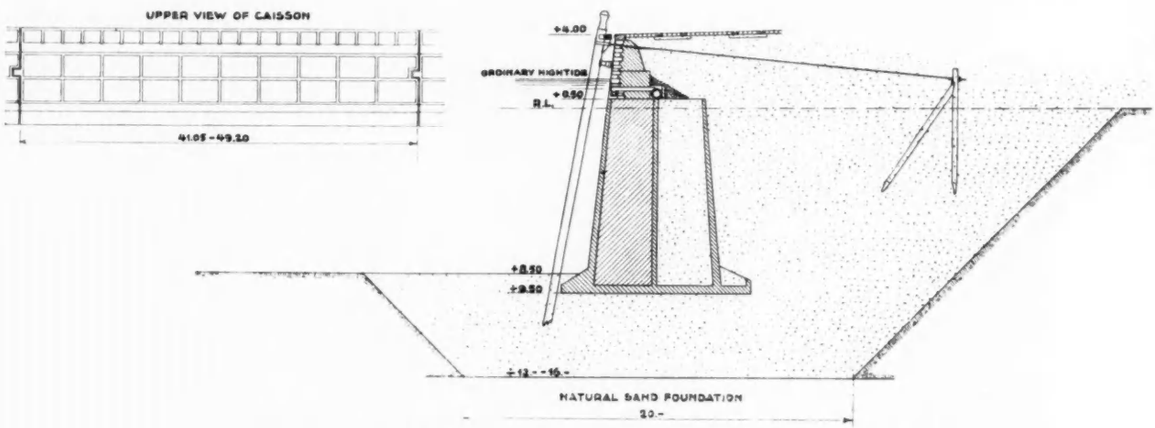


Fig. 21. Quay Wall along St. Jobshaven. Years of Construction 1906-1908.

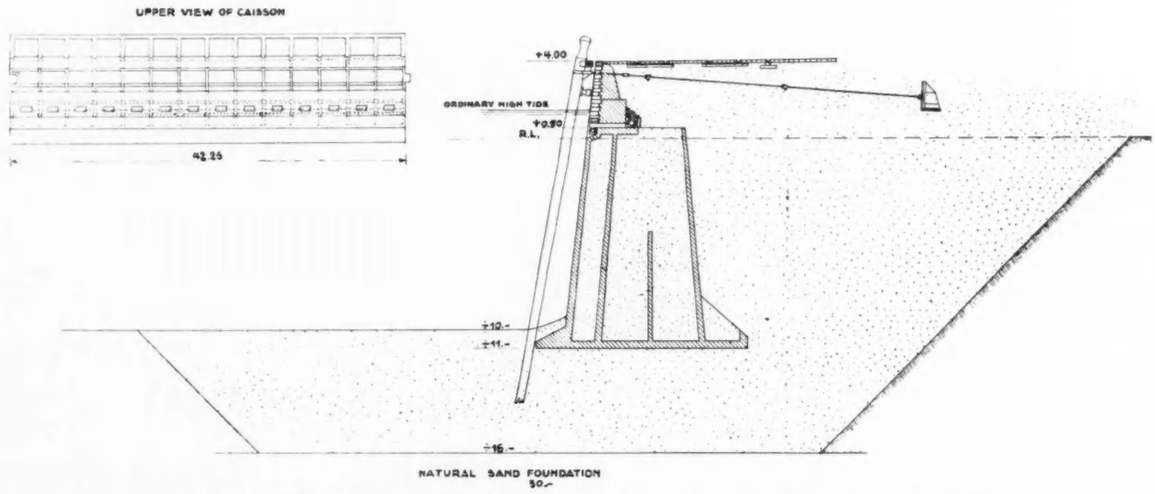


Fig. 22. Quay Wall along the Ysel and Lek Dock. Years of Construction 1913-1916.

Quay Wall Construction at Rotterdam—continued

siderable saving has been attained. It has been felt that this could be done with confidence.

In Figs. 21, 22, and 23, three Rotterdam caisson quay walls are shown in section for 8½, 10 and 12 metres (about 28, 33 and 40 ft.) of water depth at low tide respectively. Caissons for a depth of water of 12 metres have been placed for the first time in the Merwehaven.

With a view to preventing damage by collision, the front cells of the caissons were at first filled with mass concrete (Fig. 21). Later, for economy, a second parallel wall was constructed behind the front wall of the caisson, at a distance of 1.25 metres (4 ft.) from this, so that narrow front compartments were formed, by which means filling concrete could be saved. Moreover, the fore compartments were only filled with mass concrete where danger was especially to be feared from collision (Fig. 22).

The caissons constructed for the Merwehaven (Fig. 23) differ considerably from the types illustrated in Figs. 21 and 22, since all walls rise vertically and retain the same thickness throughout their height. The form work is considerably simplified by this. But the change was made in consequence of the intention to do away with the fender works that have hitherto always been placed in front of the walls, and the regular maintenance of which caused no inconsiderable expense.

Stability Calculations.

In conclusion, a few particulars may be given concerning the data upon which the stability and strength calculations of the caisson quay walls are based:—

Angle of the natural slope of sand above water: 40°
Angle of the natural slope of sand under water: 30°

Load on wharf:—
With package goods (Merwehaven) 4 tons per sq. metre.
With bulk goods (Waalhaven) 7 tons per sq. metre.

Regarding the ground pressure, it is taken that this operates in a direction normal to the vertical plane and passes through the lower part of the back of the caisson; the calculation of the ground pressure is made according to the Coulomb method. The stability of the quay wall is ascertained for two conditions:

(a) With the open river or basin water very low, viz.: at 0.50 metre below R.L. and the ground water behind the wall at 1 metre above R.L.;

(b) with the open water and the ground water both at a level of 4 metres above R.L.

The stability is considered satisfactory, if the resultant of the weight of the wall itself, any load on the wharf, the ground pressure, any difference of water pressure and any hawser pull, cuts the base area of the caisson within the middle third and forms no greater angle than one of 30° with the vertical, and further that a pressure upon the base of 40 tons per sq. metre is not exceeded.

Account is being taken, for the Merwehaven quay walls, of two hawser forces per 40-metre length of caisson, each force being of 75 tons horizontal and at right angles to the front of the quay wall.

In the reinforced concrete, stresses of 50 Kgrs. per sq. centimetre are allowed in the concrete, and 1,200 Kgrs. per sq. centimetre in the steel.

The composition of the concrete is 1 Portland cement, 1½ coarse sand, 2½ gravel.

Conclusion.

From the foregoing account, it will be seen that the construction and extension of quays at Rotterdam has been pursued upon progressive lines, meeting changing conditions and requirements by the adoption of new materials and processes, and effecting continual improvements in methods of construction in the light of experience gained.

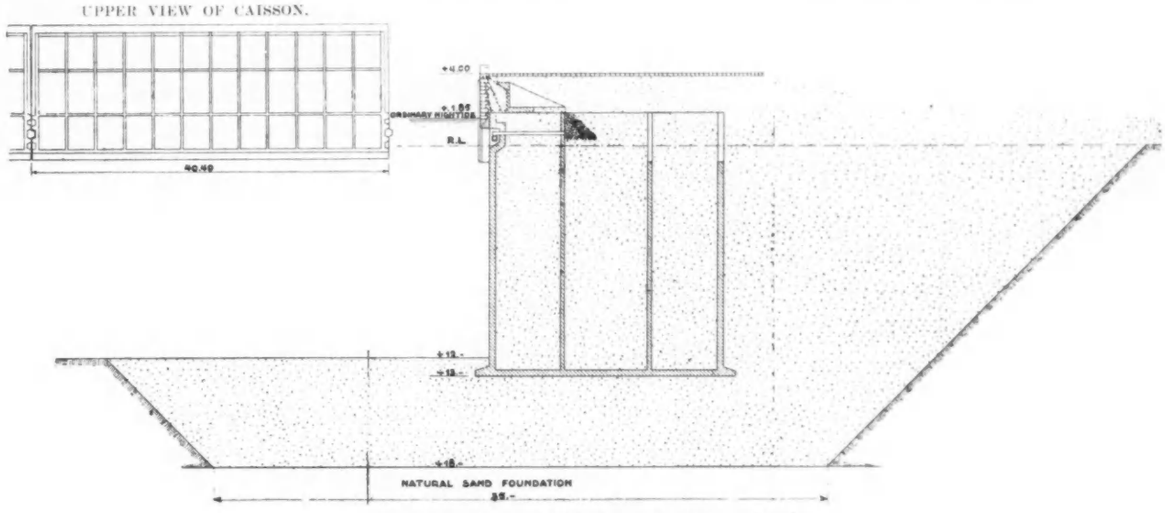


Fig. 23. Quay Wall along the Merwe Dock.

Port of London Notes

London's Shipping.

For the eighth week in succession London's shipping has aggregated over one million net register tons. During the week ended 30th August, 1,231 vessels, representing 1,004,148 net register tons, used the Port of London. Of these 495 vessels (691,443 net register tons), were to and from Empire and Foreign Ports, and 736 vessels (312,705 net register tons) were engaged in coastwise traffic.

Twenty-four timber laden vessels arrived at the Surrey Commercial and Millwall Docks with 31,000 tons of softwood.

* * * *

For nine successive weeks London's shipping has aggregated over one million net register tons. During the week ended 6th September, 1,150 vessels representing 1,156,659 net register tons used the Port of London. Of these 576 vessels (966,966 net register tons), were to and from Empire and Foreign Ports and 574 vessels (189,693 net register tons) were engaged in coastwise traffic.

Twenty-four timber laden vessels arrived at the Surrey Commercial and Millwall Docks with 38,000 tons of softwood.

* * * *

For ten successive weeks London's shipping has aggregated over one million net register tons. During the week ended 13th September, 1,388 vessels, representing 1,060,489 net register tons, used the Port of London. Of these 585 vessels (828,975 net register tons) were to and from Empire and Foreign Ports, and 803 vessels (231,514 net register tons) were engaged in coastwise traffic.

Twenty-seven timber-laden vessels arrived at the Surrey Commercial and Millwall Docks with 46,000 tons of softwood.

* * * *

For eleven successive weeks London's shipping has aggregated over one million net register tons. During the week ended 20th September, 1,272 vessels, representing 1,174,868 net register tons, used the Port of London. Of these, 518 vessels (879,999 net register tons) were to and from Empire and Foreign Ports, and 756 vessels (294,869 net register tons) were engaged in coastwise traffic.

Sixteen timber-laden vessels arrived at the Surrey Commercial and Millwall Docks with 38,242 tons of softwood.

Aden Port Trust

The returns of shipping using the port of Aden for the month of July, 1935, are as follows:—

	No.	Tonnage
Merchant Vessels over 200 tons ...	144	610,947
,, ,, under 200 tons ...	4	648
Government Vessels	6	14,774
Dhows	28	1,020
PERIM.		
Merchant Vessels over 200 tons ...	15	47,696

TRADE OF THE PORT.

Article.	Unit	Imports		Exports	
		Quantity.	Value Rs.	Quantity.	Value Rs.
Coal	Tons	2,509	35,126	0	0
Coffee	Cwts.	12,316	3,60,277	10,006	3,86,386
Grain, Pulse and Flour	,,	32,182	1,67,300	28,655	1,34,501
Gums and Resins	,,	331	7,806	2,907	73,988
Hardware	—	0	64,287	0	37,148
Hides, raw	No.	3,660	3,414	9,141	11,540
Oil, Fuel	Tons	44,020	10,41,796	0	0
,, Kerosene	Gls.	40,088	24,743	2,352	1,626
,, Petrol	,,	63,606	49,368	832	857
Salt	Tons	0	0	24,650	2,64,300
Seeds	Cwts.	2,779	23,318	493	5,516
Skins, raw	No.	253,161	1,13,421	363,370	3,07,982
Sugar	Cwts.	16,477	83,151	13,360	62,803
Textiles—					
Piece Goods, Grey	Yds.	2,314,568	3,05,910	1,437,770	1,81,827
,, ,, White	,,	472,495	77,186	266,185	44,830
,, ,, Printed or Dyed ..	,,	1,128,821	2,14,421	1,195,950	2,65,965
Twist and Yarn	Lbs.	61,300	21,887	76,445	27,792
Tobacco, Unmanufactured	,,	1,314,264	2,74,194	540,204	97,542
,, Manufactured	,,	97,608	63,712	81,248	18,572
Other Articles	No. of Pkges.	69,877	13,29,822	18,667	5,61,847
Treasure, Private	—	0	2,84,209	0	8,48,730
Total ...	—	—	45,45,348	—	33,33,752

The number of merchant vessels over 200 tons that used the Port in July, 1935, was 144 as compared with 133 in the corresponding month last year and the total tonnage was 611,000 as compared with 554,000.

Excluding coal, salt, fuel oil and Military and Naval Stores and transhipment cargo, the total tonnage of imports in the month was 8,100 and of exports 5,100 as compared with 7,100 and 4,700 respectively for the corresponding month last year.

The total value of imports excluding Government Stores was Rs. 45,45,000/-, as compared with Rs. 35,91,000/- for July, 1934 and of exports Rs. 33,34,000/-, as compared with Rs. 24,94,000/-.

The total value of both imports and exports together was Rs. 78,79,000/-, as compared with Rs. 60,85,000/- for the corresponding month last year.

Imports during the month were above those for July, 1934, in the case of coffee, grain, pulse and flour, gums and resins, hardware, unmanufactured tobacco and private treasure, and below in the case of raw hides, seeds, raw skins, sugar, grey, white and printed or dyed piece goods, twist and yarn and manufactured tobacco.

Exports were above those for July, 1934, in the case of coffee, grain, pulse and flour, hardware, raw hides, seeds, printed or dyed piece goods, and private treasure, and below in the case of gums and resins, raw skins, sugar, grey and white piece goods, twist and yarn, unmanufactured and manufactured tobacco.

Bombay Port Trust

At a meeting of the Trustees of the Port of Bombay, held on the 13th August, 1935, the following were the main items of business disposed of:—

The Audited Accounts for the year ended 31st March, 1935, were approved for submission to Government. The Board recorded a note by the Chairman reviewing the results of retrenchment during the year 1934-35.

Amendments of the Bombay Port Trust Railway Goods Tariff were sanctioned to provide for (1) levy of reduced charges on foreign Railway wagons containing grain, seeds, etc., rebooked back to Grain Depot without being unloaded in the Docks (2) reduction of the penalty charge for loading wagons in excess of marked carrying capacity.

The Board considered reports by the Marine Committee regarding present dredging plant and future requirements of new plant. In 1933 the Trustees authorised the Chief Engineer, in view of the proved saving and other advantages of drag suction dredging over bucket ladder dredging, to proceed with the preparation of specifications for a dredger of this type, estimated to cost Rs. 13½ lakhs; but later in the same year sanctioned the Chief Engineer's proposal to adapt the 800-ton hopper-barge, "Spotbill," for use as a drag suction dredger which, it was considered, would furnish valuable information in designing the proposed new dredger. A saving of Rs. 25,000 a year in maintenance dredging costs was anticipated; this however, has proved, as the result of a year's working, to be approximately Rs. 1 lakh. The experience so far gained has thus more than fulfilled expectations and the Board decided to convert another hopper-barge ("Widgeon") for drag suction dredging at a cost of Rs. 1,14,118, which it is estimated will effect a further saving of Rs. 1.66 lakhs a year in maintenance dredging and render it unnecessary to proceed with the originally contemplated new dredger.

* * * *

Imports and Exports at the Port of Bombay:—

Quarter ended June	1933-34 Import Tons	1933-34 Export Tons	1933-34 Total Tons	1934-35 Import Tons	1934-35 Export Tons	1934-35 Total Tons
Docks ...	512,626	496,846	1,009,472	458,540	449,595	908,135
,, (overside and transhipment)	42,996	62,578	105,574	42,891	50,276	93,167
Bunders ...	262,858	63,701	326,559	304,140	74,968	379,108
Total	818,480	623,125	1,441,605	805,571	574,839	1,380,410

Vessels other the ferry steamers, hired transports, Government vessels and country craft, which entered the Port of Bombay.

Quarter ended June.	1933-34 No.	1933-34 Net register tonnage.	1934-35 No.	1934-35 Net register tonnage.
Vessels engaged in foreign trade ...	211	930,766	225	985,059
Vessels engaged in coasting trade ...	545	538,310	561	547,967
Total	756	1,469,076	786	1,533,026

Notes from the North

Mersey Tunnel Appointment.

Sir Basil Mott has been appointed consulting engineer to the Mersey Tunnel Joint Committee for three years, at a fee of 500 guineas a year, to make half-yearly inspections of the tunnel and report to the Committee. At the last meeting of the Committee, it was reported that excluding capitalised interest and promotion expenses, the amount spent on capital account to 31st August last, was £6,732,686, compared with the estimate of £7,077,800. The net capitalised interest and promotion expenses amounted to £604,228, making an estimated total of £7,682,028.

Proposed New Mersey Bridge.

Widnes Chamber of Commerce has decided to bring the proposition of a road bridge across the River Mersey to connect Widnes and Runcorn to the notice of a joint committee of the Widnes Town Council and the Widnes Chamber of Commerce. Mr. W. Arndell said the Runcorn position was that there would always have to be a bridge between Widnes and Runcorn, and they wanted a permanent road bridge. Runcorn has sent a resolution to the Lancashire Development Council, and they asked Widnes as a friendly gesture to support it.

Llanfairfechan Sea Defences.

Llanfairfechan Council has received from its consulting engineer, Mr. W. Muirhead, a report re proposed sea defence works. Mr. Muirhead intimated that no monetary grant could now be made for such works, but the funds would have to be borrowed subject to the Ministry's approval. In order to do this, the plans, specification and estimate of cost must first be approved of by the Council, and forwarded to the Minister, who, after consideration and approval of them, would hold a local inquiry on the spot. Mr. Timmins raised the question of the cost of the proposed sea defence work and said that the Council should seriously consider the financial position. Mr. J. D. Williams suggested that a deputation should be sent to the Ministry with a view to having a grant for the scheme, and that Mr. Lloyd George should be asked to accompany the deputation. The owners of land on the Promenade, who had given it up to the Council, paid £657 in rates. That was equivalent to a 1s. rate. The estimated cost of sea defence work was £7,350, and the maximum period of the loan would be 20 years, while the annual repayment would be equivalent to a 9d. rate. The present commitments of the Council totalled £53,742, excluding the cost of the sea defence works. If that was included, the total commitments would be £61,092. He moved that a deputation be sent to London to apply for a grant. This was agreed.

Mr. R. J. Hall.

Mr. R. J. Hall, who has been nominated for the Lord Mayoralty of Liverpool, is keenly interested in port affairs. It may be remembered that at a meeting of a professional transport organisation about two years ago, he read a paper in which he spoke of the benefits that would accrue from the co-ordination of port services, especially to the Merseyside authorities. No one is more competent to speak on such a subject, for Mr. Hall has an intimate knowledge of transport by rail, road and sea.

He is managing director of the Mersey Wharfage Company, and of Mersey Tobacco Bonds, Ltd. A year or two ago he held the position of chairman of the Transport Section of the Birkenhead Chamber of Commerce. He received his early training under the late Sir Frank Ree, formerly district goods manager for the London and North-Western Railway Company. Subsequently, he joined the Tedcastle Line and became acquainted with all the ins and outs of cross-channel shipping. He established the Mersey Wharfage Company to meet the demands for terminal accommodation by those shipping lines and lighterage firms whose business did not warrant the cost of a separate establishment. When, 14 years ago, the Leeds and Liverpool Canal Company withdrew from the carrying trade, the Mersey Wharfage Company took over their transit sheds in Bootle and Liverpool. Later, the Liverpool Warehousing Company took over this section of the business.

Ribble Navigation.

In the accounts of the Preston Corporation it is revealed that the surplus on the Ribble Undertaking during the past year of £74,554, is £7,359 more than the next highest, viz., £67,195 in 1926-7. As compared with the year 1933-4, there was an expansion of £10,348 on revenue, largely due to a growth of £8,217 in the sums received for discharging and loading vessels and warehousing.

Working expenses declined by £1,215. Although the cost of dredging maintenance fell from £25,882 to £16,524, loading and discharging increased by £5,588, and £4,015 was spent on the replacement of a shunting locomotive. Normal loan charges required a net sum of £80,852, which was £3,487 less than in 1933-34, and for the first time the undertaking became liable to the payment of income tax, the charges amounting to £2,465, by which sum the amount paid to the Revenue exceeded the deductions from interest and other annual payments.

The actual deficiency for the year was £8,763, but as £30,488 was raised in the rate for the undertaking, an additional sum of £5,000 was paid to the sinking fund in respect of the original debt, and £11,327 was applied to the payment of capital expenditure incurred during the year. These allocations raised the deficiency to £25,090, leaving £5,398 to augment the balance, which has been increased to £28,871. The total indebtedness was reduced by £31,449 to £1,075,325.

Dock Bridges.

There are now only four of the swing type of bridges left on the Cheshire side of the dock estate. The oldest of these spans the entrance to the Morpeth Dock, Birkenhead, while the one at Poulton and the other over the Alfred are comparatively new. All the rest are of the bascule type, of which the first to be erected was over the passages at North Alfred, the Wallasey and Egerton docks and the East Float. It may seem somewhat strange that within the course of about ten years the Mersey Docks and Harbour Board should have erected two distinct types of bridges. The swing bridge over one of the entrances to the East Float, although only about seven years old, is the odd one in four.

Trafford Park Enterprises.

Two companies which operate at Trafford Park, largely in connection with the Manchester Ship Canal, and which showed greatly improved results for 1933-34, as compared with 1932-33, issue their reports for the year just ended. Port of Manchester Warehouses, Ltd., shows a profit of £8,399, against one of £9,254 for the previous year, though against one of £7,058 for the year before that.

Trafford Park Cold Storage, Ltd., which is controlled by Trafford Park Estates, Ltd., shows a profit of £3,218, against one of £3,014 for 1933-4 and one of £2,112 for 1932-3.

Manchester Ship Canal.

Manchester Ship Canal Company, in its monthly approximate traffic return for August, indicates that receipts amounted to £98,512, representing an increase on the same month of last year of £4,481. The receipts for the eight months of 1935 were £807,758, compared with £792,415 for the first eight months of 1934. The figures must be regarded as evidence of the trade improvement so far as Lancashire industries are concerned.

Southampton Docks.

To mark the great development in the South African fruit trade at Southampton during the past twenty-five years, a luncheon was held on board the Union-Castle Mail S.S. Company's m.v. "Winchester Castle," on the 22nd August last. The event was attended by representatives of the South African Co-operative Citrus Exchange and of the fruit trade in the southern counties. Replying to the toast of "The Port of Southampton," Sir Herbert Walker, General Manager of the Southern Railway Company, mentioned that in 1919, 43,000 cases of South African citrus fruit was imported through the Docks. In 1934, the imports had risen to the enormous figure of 1,845,181 cases. Southampton's importance as an Empire Port was also alluded to, it being stated that sixty-five per cent. of the exports and imports through the Docks were to or from the Empire.

For two months in succession the quantity of shipping tonnage entering the Docks has exceeded two million tons, the aggregate for August being 2,094,000 tons, a figure slightly below the record monthly total set up in July last. The consistent increase registered, month by month, in the volume of shipping using the Docks this year renders it almost certain that 1935 will be a record year for Southampton as far as shipping activity is concerned. During the first eight months the advance over the previous year's corresponding figures has approximated to eight per cent. and there is a likelihood of this advance being maintained throughout the closing months.

Some exceptionally busy periods were experienced at the Docks during September and the three-day rush that ended on Saturday, 7th September, was one of the busiest of the year. In the course of the three days more than 500,000 tons of shipping used the Port and twenty-four ocean liners arrived or sailed. The latter were principally engaged in the North Atlantic passenger trade and on pleasure cruising activities.

Italian Harbour Affairs

THE first two piers in the Mussolini Dock under construction in the port of Genoa, with their 1,900 metres of quayage, will, when completed ease the traffic at the old quays, so it is felt that the opening of the further two piers in the above mentioned dock is not an immediate necessity, in view of the difficult situation of international trade. It has been decided however, to continue the construction of the two piers, especially in view of the fact that their building is well forward.

The first two piers in the Mussolini Dock were put into operation in September. On these piers there are twenty-four 3 to 6 ton cranes and a new warehouse, fitted in the interior with 12 electric cranes of one ton to facilitate the handling of goods. Rails are being placed on both piers, and on the second one there is under construction a concrete warehouse measuring 109 metres in length. The roads connecting the various sections of the Mussolini Dock are also practically completed.

In connection with the new works under construction in the port of Genoa, the building of the new fourth dry dock has been started. This will be placed parallel to the Guardiano Mole at a distance of 50 metres, where it will be possible to construct the bottom of the new dock at a depth of 18.50 metres. The new dock will have the following dimensions: Length: 350 metres; width at bottom, 40 metres; depth at entrance: 13 metres; depth at the middle of the dock: 14.20 metres. The new dock will have two entrances; one northward towards the inner port for large liners and one southward towards the Duca degli Abruzzi Dock, through the cutting of the Giano Mole, for smaller vessels up to a length of 120 metres. The new dock, which is to be completed by February 28th, 1938, has been estimated to cost 55,000,000 lire.

In connection with shipping at Trieste it may be interesting to consider the following figures, which have just been published by the Consiglio Provinciale dell'Economia Corporativa at that port (Chamber of Commerce and Industry):—

	1935 JANUARY-JULY	1934 JANUARY-JULY
ARRIVALS	CENTALS	CENTALS
By Rail	4,233,808	3,624,303
By Sea	10,207,852	10,138,120
	14,441,660	13,762,423
CLEARANCES		
By Rail	5,466,429	5,048,044
By Sea	3,991,874	3,640,801
	9,458,303	8,688,845
TOTAL TRADE		
By Rail	9,700,237	8,672,347
By Sea	14,199,726	13,778,921
	23,899,963	22,451,268

Shipping at Trieste during the first seven months of 1935, has shown an increase of 1,448,695 centals due to a great extent to an increase in transit trade, and to shipping with the Near East and the Levant.

The fact that the Ministry for Corporations (National Economy) has authorized the Aquila Società Tecnico Industriale S.A. to erect a new oil refinery in Trieste to work from 250,000 to 350,000 tons yearly of crude oil has raised the question of the construction of a new oil dock where this commodity can be handled with up-to-date facilities. A decision in this matter will not be made until the beginning of 1936.

The Azienda dei Mezzi Meccanici e degli Arredamenti del Porto di Napoli has published the following figures regarding shipping at that port during the first six months of 1935:—

	ARRIVALS AND CLEARANCES		TRADE (IMPORTS AND EXPORTS)			
	No.	N.R.T.	With Foreign Countries Tons	With Italy Tons	With Italian Colonies Tons	Total Tons
1935	9,337	12,884,595	886,888	227,919	115,123	1,230,930
1934	9,254	11,975,827	696,968	246,519	13,899	957,386
1933	9,234	10,475,131	741,203	207,660	10,707	959,570

Traffic at Naples has shown an increase of nearly 300,000 tons in six months due to the progress in trade with foreign countries and Italian colonies. The quantity of ship's stores and bunkers supplied in the port of Naples during the period from January to June, 1935, included 202,348 tons against 140,484 tons during the corresponding period of 1934, and 187,952 tons during the corresponding period of 1933.

The position of the various countries calling at Naples is shown in the following figures published by the Azienda dei Mezzi Meccanici e degli Arredamenti Portuali di Napoli:—

	ARRIVALS AND CLEARANCES 1934			1935		
	No. of Vessels	N.R.T.	Goods Tons	No. of Vessels	N.R.T.	Goods Tons
Italy	3,627	7,614,516	585,844	3,975	8,371,028	663,651
Britain ...	320	1,575,893	63,594	319	1,557,826	97,632
America ...	110	568,025	28,072	101	558,769	38,201
France ...	58	250,668	16,397	83	349,979	58,408
Japan	52	339,970	7,363	52	336,213	14,929
Germany ...	85	306,357	16,887	87	329,737	25,678
Norway ...	101	160,159	33,621	87	99,526	30,172
Holland ...	70	242,604	22,724	72	268,338	12,953
Greece... ...	56	91,014	68,131	46	83,921	78,367
Roumania ...	23	68,703	28,045	38	107,864	68,178
Spain	20	49,872	46,269	22	48,687	46,309
Sweden ...	32	54,119	7,386	40	59,857	16,856
Denmark ...	43	30,677	10,027	69	65,351	20,058
Belgium ...	22	31,259	7,019	26	44,573	12,258
Jugoslavia ...	12	6,660	1,391	8	18,154	2,992
Russia... ...	2	3,116	2,292	14	27,571	13,243
Other Countries	19	35,186	7,352	32	59,159	28,329
	4,652	11,428,798	952,414	5,071	12,386,553	1,228,214
Difference ...	—	—	—	+419	+957,755	+275,800

The port of Naples has been divided into three zones, namely (a) the Littorio Dock, including the Passenger Station on the Beverello Mole (b) the Principe di Piemonte Dock, including the quayage used for coastwise trade, the old Maritime Passenger Station, the Grain Silos and the General Bonded Stores on the Carmine Pier, and (c) the Vittorio Emanuele III. Dock, including the Coal Trade Pier, the Lumber Pier and the New Piers in the western part of the port.

Trade in the port of Massowah in the Red Sea has reached in the past few months a daily average of goods unloaded and loaded of 3,600 tons against 320 tons not less than a year ago. The improvement of the road facilities between Massowah and the interior of Eritrea has allowed the Italian authorities at Massowah to prevent congestion, as goods unloaded are shipped immediately by truck to Asmara and other centres in the interior. In regard to facilities at Italian colonial ports, the dredger, "Generale Chiodo" is working at Tripoli (Lybia) to give the inner port a depth of 15 metres in order to allow liners on pleasure cruises to land passengers alongside.

Irish Harbour Matters

Sligo Port.

Mr. A. P. Jackson, Chairman of Sligo Harbour Board, at a recent meeting, declared that "If Sligo Port is to keep going at all we must do something to improve the condition of the upper quays, and also dredge and deepen the outside approaches to the harbour." Two years ago, he said, the Board engaged Sir Alexander Gibb and Partners, London, consulting engineers, at a cost of £1,250 out of harbour revenue, to make certain investigations and report. The Board put forward to the Department some of the recommendations made by the consulting engineers, at a suggested expenditure of £40,250, and asked for Government assistance. On the 19th October, 1934, they got a reply from the Finance Department stating that they were unable at that time to make any grant from State funds. The time had come when they should try again.

Mr. D. M. Hanly said that Sligo contributed as much to the national exchequer as any other town of its size in the Free State, and it was time they got their share of any money that was going for this purpose.

The Chairman, Secretary and Mr. D. M. Hanly were appointed as a deputation to the Minister for Industry and Commerce.

Drogheda's Progress.

At the last meeting of the Drogheda Harbour Board it was mentioned in the Harbour Master's report that Drogheda's port traffic during the past two months has been heavier than for several years past. During the last fortnight of August, five overseas ships arrived at the port, the cargoes carried being sugar, cement, general goods, oils and timber. On August 31st, the motor vessel "Hydra," took the first outward cargo of refined oils and cake from the Irish Oil and Cake Mills. This cargo was consigned to Cork and Waterford, and comprised 62 tons of cakes and meals, and 190 tons of various oils. Over 100 men are employed in the factory at present.

Hull and the East Coast

Road Bridge over the River Humber.

IN connection with the new scheme for the construction of a road bridge over the River Humber to connect Hull with North Lincolnshire and towards the cost of preliminary investigations, the Hull Corporation have voted £500. Test borings are now being undertaken by a London firm under the supervision of Sir Douglas Fox and Partners. The borings are being made in order to ascertain the most suitable foundations for the piers of the proposed bridge. The precise place is at Long Close, a field at Barton-on-Humber and near the river bank. Satisfactory progress has been made, and at the beginning of this month the bore had reached a depth of 65 ft., where a stratum of good hard clay was found.

In the tests carried out in connection with the former project chalk was struck. The present test, extending to a depth of 100 ft., would appear to be more successful. The work at Barton is to be followed by similar boring at Hessle on the East Riding bank of the river. The bores are being sunk at what are the probable sites of the bridge-head on either bank of the river, providing there is suitable foundations for the weight and stress of the bridge. It has always been part of the scheme to build the bridge at the narrowest part of the Humber. Between Hessle, just above Hull and Barton, the width of the river is about 1¼ miles. When the preliminary investigations have been completed a report will be prepared for the information of the Minister of Transport in the hope that it will meet with his favourable consideration and result in a Government grant towards the cost, which will in all probability be in the region of £1,750,000. As stated in a previous report, the novel feature of the revived project is a single span sufficiently wide to obviate the necessity of building piers in and near the navigable channel with the consequent attendant risk of danger to shipping going up the river to Goole.

Humber Coal Exports.

The fact that Humber coal exporters are not able to do the foreign business they might do owing to the lack of adequate supplies and that the coal appliances at the ports are to a large extent idle, is giving cause for anxiety. Strong protests have had to be made to secure an increased shipment quota, and even that is not enough to assist them to deal with fresh enquiries. The Committee of Investigation, who recently held an inquiry, has not yet reported, but it is hoped that a scheme will be evolved which will solve the present difficulty. Exports of coal from the Humber ports do not improve, and last year's low level is barely maintained.

The Aire and Calder Navigation.

The Aire and Calder Navigation and the Lower Ouse Improvement Committee intimate that after operations extending over ten months the River Ouse at Goole is again clear of wreck debris. Wrecks in the Ouse are unusual, and until the motor vessel "Eddie" sunk at Goole Ness last October it had always been possible to lift and float sunken vessels. "Eddie," however, defied the efforts of two salvage firms to lift her, and the difficulties were increased when one of the salvage tugs, "Osprey," was holed by striking the submerged vessel and settled on top of it. Efforts made to lift "Osprey" failed, and as a last resort the protruding portions of the sunken vessels were dispersed by explosives.

Scarborough Harbour handed over to Scarborough Corporation.

The last meeting of the Scarborough Harbour Commissioners under the old constitution, which had been in existence 650 years, has been held, and the undertaking was formally handed over to the Scarborough Corporation, the new owners. The keys and seal were handed to the Mayor by the retiring Chairman. Before this was done the final annual report and statement of accounts were presented and adopted. These showed that in the past financial year the gross revenue from the Harbour undertaking was £7,795, as compared with £6,848 in the previous period and £6,291 in 1932-3. The total expenditure was £6,135, leaving a surplus of £1,660 before charging interest on Corporation loans. This compares very favourably with the previous year when the credit balance was £356. There was increased revenue from tonnage and bridge dues, coal, stone and gravel, cereal goods, etc., the increased total being primarily due to coal for the Corporation's electricity undertaking brought by sea. Unfortunately, owing to the supply of electricity now being taken from the "grid" the coal contract has ceased. The income was also added to by the increasing popularity of the piers and lighthouse, pleasure steamers and amusements. After charging interest on loans the adverse balance on the year was £789. In moving the adoption of the report, the Chairman (Councillor Jackson) stated that going back 200 years he could not find any year in which there had been larger receipts. On the upkeep of the piers and harbour £1,991 had been spent, as against £1,599 in the previous twelve months. While there was a decrease in the dues received from fishing vessels, he hoped that the day would come when this branch of the Harbour's activities would recover. The pleasure steamers had carried 98,000 passengers, and this season that figure would in all probability be improved upon, while the reconstructed lighthouse (on money raised by the Townsmen's Association) had proved "a little gold mine." Councillor Catchpole, who seconded, said that the decrease in what might be termed the legitimate or trade revenue of the port had been more than made up from extraneous sources, which had enabled the Commissioners to spend a fair amount uupon the maintenance of the harbour in an efficient state, although they had not been able to do all that was necessary. A vast improvement had been effected in recent years, and he trusted that this would continue under the new constitution as the first duty of a Harbour Board was to see that its piers and basins were kept up to the requisite standard. He also urged the importance of the fishing industry alike to the harbour and the general trade of the town, especially in the winter months. In the past the Commissioners had considered this, and he hoped that under the new constitution they would continue to do so and attempt to rescue it from its present unhappy position.

In formally handing over the undertaking to the Mayor, Councillor Jackson referred to it as a very pleasant duty, and said that during the 650 years that the harbour had existed there had never appeared the harmony between the Commissioners and the Corporation that was desirable; there had always been some kind of offences and separations. In the new situation he hoped there would be that unity of purpose and sympathy which were requisite and necessary, not only in the interests of the fishing industry, but of the harbour and piers, which was vital to the interests of Scarborough as a whole. Though his efforts had not produced that which he had desired when three years ago they had received an offer of £100,000 for the harbour undertaking, he felt it better to hand it over to the Scarborough Corporation for safe custody than to allow it to pass into the hands of a private syndicate. Councillor Jackson, in retiring from the chair, also tendered his resignation as a life Commissioner.

The Mayor (Alderman F. Whittaker) expressed thanks to Councillor Jackson for his services as chairman during the past three years, and gave the assurance that while technically the Corporation were taking over the harbour they had no desire whatever to interfere with its internal working and made no claim to the chair, which they preferred should be occupied by one of the Commissioners. The only thing they did ask was that the Corporation should have the right to come to the Commissioners if at any time a major financial problem arose. A meeting of the new Commission constituted under the Scarborough Harbour Order 1935 was then held when the Mayor presided and moved the re-appointment of the permanent officials and staff, and, pending the election of new Committees at the first monthly meeting, the existing Committees were authorised to continue the administration of affairs with the deputy-chairman (Captain Aiston) as acting chairman. Under the new regime the harbour, now freed from debt, will be governed by fourteen Commissioners nominated by the Scarborough Corporation, six life Commissioners, three representatives of payers of harbour dues and three registered shipowners.

Rhyl Sea Works

The Ministry of Health has approved the Rhyl Urban District Council's £29,925 scheme for the carrying out of sea defence works and the training of the mouth of the River Clwyd, which, by its deviation from its original course, has during recent years created a serious foreshore problem for the town. The scheme, in July last, was the subject of a public inquiry held by Mr. W. Fyffe, on behalf of the Ministry of Health, and it was there stated that the loan estimated to be necessary to carry it out would, if granted for 30 years, mean an annual local charge equivalent to a rate of 2½d. in the £.

Tenders are to be invited for the putting in hand of the proposed works. The Clwyd has for years caused concern owing to its scouring action. In the past it flowed in a northerly direction and went out to sea at right angles to the promenade. For many years now, however, it has tended to flow in a new twisting channel parallel with the promenade. The Council intends building a steel-piled groyne to turn the river back into its original channel and to remove what is known as "Horton's Nose," a long split of sand and gravel which has much to do with the change in the river's flow.

North-East Coast Notes

Lull in Tyne Coal Trade.

THE coal trade upon which the North-East Coast depends so largely for its prosperity practically always languishes during August and September and this year has been no exception. The hot weather of the former month undoubtedly diminished consumption at home, and there were several factors which tended to lessen export trade, especially the Italian position. The shipments from the North-East Coast area up to the beginning of September were unofficially put at 17,128,514 tons, compared with 17,083,471 in the previous year, but although the figures given make a not unfavourable comparison with 1934, the Tyne shipments were rather heavily down so far this year, the total decrease being in the neighbourhood of 400,000 tons. The comparison might have been still less favourable, but for the very heavy trade in coke which is well maintained despite all competition. Yet it is noteworthy that in a dull period the best loadings in the Tyne for four years were recorded on August 26, when the total coal and coke shipments reached the very satisfactory aggregate of 102,355 tons. This figure had not been equalled since June, 1931.

It is noteworthy that the drop in the shipments from the Tyne referred to above is attributed largely to the falling-off in the bunkering trade, which for the first six months was 160,345 tons short of the figures for the first half of last year. Such a decrease is naturally viewed with some concern by the Tyne Improvement Commission and they have accordingly instructed their general manager, Mr. Richard Aughton, to prepare a special report on the causes of this decline.

The departure of steamers from the Tyne for the Kara Sea to load Russian timber for the United Kingdom and other countries has acorded much and varied employment in the area. Of the total of vessels outward bound, 18 were overhauled at Tyne shipbuilding works, 14 being British (11 locally owned). Their sizes ranged from 3,200 tons to 6,400 tons deadweight.

Competition for Danish Trade.

The River Wear Commissioners had before them at their August meeting a report from their commercial representative, Mr. Bown, regarding the prospects of attracting Danish trade to Sunderland, and after a very exhaustive discussion a Subcommittee was appointed to examine the whole question and to report to the Board and Corporation as early as possible. A sequel to this movement is the appointment of a joint committee representative of Newcastle Corporation and the Tyne Improvement Commission which has been set up "to safeguard the interests of the Tyne." The Tyne representatives point out that the Danish trade has been established on the Tyne for more than 60 years, Newcastle having long been recognised as the chief distributing centre for foodstuffs, and the Tyne is naturally anxious for the retention of this important trade. It has never been suggested that there is any lack of facilities at Newcastle Quay for the handling of Danish cargo. On the contrary, it has been increasingly demonstrated that Newcastle has every factor in its favour for quick distribution over a large area of population.

Appended are the latest statistics regarding Wear trade:—

IMPORTS

	7 months 1934	7 months 1935
Timber and Props ...	56,670 loads	61,746 loads
Grain	10,837 tons	4,449 tons
Esparto	13,519 ,,	14,136 ,,
Iron Ore	20,426 ,,	27,549 ,,
Cement	10,395 ,,	10,318 ,,
Petroleum	47,239 ,,	50,218 ,,
Wood Pulp	2,728 ,,	3,?86 ,,
Iron and Steel	25 ,,	272 ,,
Sundries	20,896 ,,	17,072 ,,

Total Imports: 7 months 1934, 182,735 tons; 7 months 1935, 189,146 tons.

EXPORTS

	7 months 1934	7 months 1935
Machinery	979 tons	1,224 tons
Iron and Steel	696 ,,	—
Pitch and Tar	9,778 ,,	6,429 ,,
Creosote	5,987 ,,	—
Petroleum	6,006 ,,	11,223 ,,
Sundries	7,190 ,,	5,615 ,,

Total Exports (Excluding coal and coke): 7 months 1934, 30,636 tons; 7 months 1935, 24,491 tons.

The coal and coke shipments for the same period totalled 2,253,130 tons for 1935, compared with 2,342,005 tons in 1934.

Bigger Tees Shipments.

Official returns reveal that during August, which, owing to the holiday interruptions, is usually the dullest month of the year, the exports of iron and steel from Teeside exceeded 50,000 tons, the largest monthly tonnage shipped since April last. An encouraging feature is that the expansion has been largely due to an increase in overseas trade in manufactured steel, the clearances amounting to 27,391 tons compared with 26,647 tons in July and only 15,161 tons in the month of June.

The restriction of imports of iron and steel under the agreement with the European Steel Cartel is reflected in the return of imports to the River Tees issued by the Tees Conservancy Commission. During August, only 1,920 tons of iron and steel were imported compared with 5,749 tons in July, and 4,882 tons in August last year.

It is reported that Cargo Fleet Steel and Iron Co., Middlesbrough, which is engaged at present on large developments, contemplate further large addition to their steel plant. Mr. A. N. McQuistan, director, and Mr. Isaac William, chief engineer, are visiting the United States primarily to investigate the latest types of cold rolling mill and finishing plant for the production of wide sheets, which are largely used in the motor car and pressing trades. Mr. McQuistan stated that at Cargo Fleet they were laying themselves out more and more to cater for the needs of makers of motor car bodies. That was the reason for the new mill and it was also the reason for the visit to America.

Some Tyne Topics.

Some interesting suggestions were made recently when local members of the Institute of Shipbrokers accepted the invitation of the Tyne Improvement Commission to make a survey of the river. The need for the introduction of a simplified scale in respect of certain dues and charges were emphasised. It was pointed out that the existing scale because of the percentage additions or deductions on the basis rates which had to be calculated, added to the complications in estimating these charges in cases of vessels coming to the river. Some of the principal continental ports were able to supply a flat rate for these charges covering all dues, thus simplifying the work of the broker and rendering estimates easier. It would be helpful to the broker or owner abroad if a similar flat rate method could be evolved for the Tyne. The chairman of the Commission (Mr. H. P. Everett) said he would make a note of the points raised.

An extension scheme is being commenced at the ship repairing yard of Palmers (Hebburn) Company, Ltd., Hebburn, which is now controlled by Messrs. Vickers-Armstrong. The river jetty is to be extended by 450 feet and the contract has been let to Messrs. Brims and Co., of Newcastle.

It is also understood that the Middle Docks and Engineering Co., South Shields, is considering the question of the construction of a new graving dock at a cost of £150,000. Of this amount £80,000 would be for wages. South Shields Corporation is willing to sell land for the purpose.

Southampton Docks Returns for August.

The substantial increase in the volume of passengers who passed through Southampton Docks during July was in large measure attributable to the many thousands of people who set out from the port in ships of all types to witness the Royal Naval Review in Spithead. At the same time, it was recognised that the general passenger traffic was also on the upgrade.

This fact is proved beyond doubt by the Dock returns for August. These returns are highly satisfactory from every view-point, for when the numbers of passengers arriving and departing are considered collectively there is a balance of nearly 12,000 over August, 1934.

The number inward was 57,084, as against 52,762, and outward 66,100, as compared with 58,583. The respective increases were, therefore, 4,322 inward and 7,517 outward.

The most striking feature of the return is that in respect of inward passengers, for it clearly indicates that the duration of the holiday season is being gradually extended. This has been particularly noticeable in the case of American bookings for the North Atlantic crossing.

The number of ships which used the docks during August was 333 inward, as compared with 317 and 341 outward, as compared with 321. This advance was reflected in the tonnage returns. Inward gross tonnage amounted to 2,094,918 tons, which was 239,606 tons in excess of the figure for August, 1934, namely, 1,855,312 tons. The outward total was up by 262,850 tons, the respective figures for August this year and for the corresponding month last year being 2,109,506 tons and 1,846,656 tons.

The net tonnage inward was 1,136,517 tons, compared with 953,043 tons, and outward 1,139,750 tons, as against 945,479 tons. The increases were, therefore, 183,474 tons inward and 194,271 tons outward.

Cargo was not quite so satisfactory as in recent months, but the aggregate decrease was very small. Imports amounted to 48,354 tons and exports to 31,018 tons, as compared with 50,405 tons and 30,379 tons respectively. This gave a decrease of 2,051 tons in imports, but an increase of 639 tons in exports.

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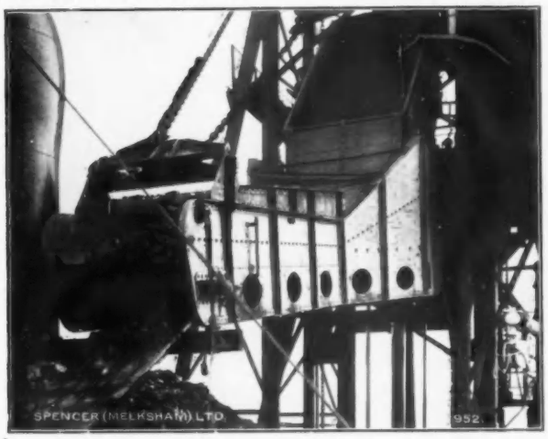

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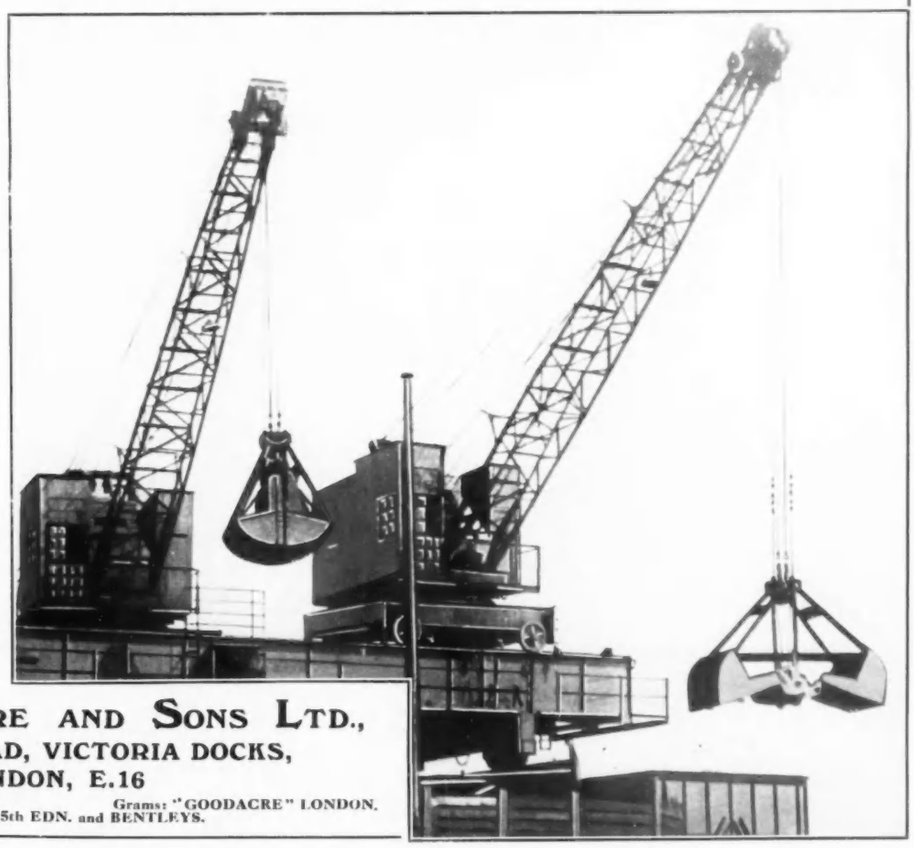

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News from all Quarters

U.S.A.

RECENT discussions on the advisability of providing New York with a free harbour have culminated in the presentation by New York experts of plans for the accomplishment of the work at a cost of $7,000,000. These are now being considered by the State Council for the Establishment of Free Harbours. In the event of their not being accepted, an alternative plan, which is now under preparation in San Francisco, will be suggested to the Council.

Brazil

The ingoing traffic in the harbour of Santos amounted, during the second quarter of the current year, to 625 vessels with a tonnage of about 2,315,000 b.r.t., as compared with 627 vessels with a tonnage of 2,300,000 b.r.t. during the first quarter. The outgoing traffic amounted over the same periods to 608 vessels with 2,239,000 b.r.t., as compared with 614 vessels with 2,200,000 b.r.t. The principal goods exported during the second quarter of the year were 21,758 60-kg. sacks of coffee, 122,227 bales of cotton weighing 20,781,000 kg., and 13,526,000 kg. of cottonseed cakes.

Venezuela

Recent increases in the traffic of the harbour of Guiria in the Gulf of Paria have rendered the enlargement of the facilities a matter of some urgency. It has accordingly been decided to construct at considerable cost a complete new mole, and to build on it all the necessary structures for the conclusion of customs business. The work is to be put in hand as soon as the financial arrangements can be completed.

Uruguay

The total amount of traffic in the harbours of the Republic of Uruguay has during recent years shown an alarming decrease. Whilst in the year 1930 it amounted to 7,760 steamers and 5,775 sailing vessels with a total tonnage of 60,000,000 n.r.t., it had in 1934 declined to 5,400 steamers and 2,145 sailing vessels with only 10,370,000 n.r.t. In 1934, as in previous years, the harbour of Montevideo proved by far the most important from the amount of traffic dealt with, which had a tonnage of 9,200,000 n.r.t.

Algeria

In the first half of the current year, 2,194 vessels with a tonnage of 3,940,834 tons entered the harbours of Algeria, whilst 2,245 vessels with 4,053,093 tons cleared. The total weight of the goods exported from the harbours during the above period was 2,006,417 tons, whilst the goods imported weighed 3,001,618 tons. Slight increases were registered over the corresponding period of the previous year in the tonnage of vessels both entering and clearing, and in that of goods exported, whilst an increase of no less than 13 per cent. was noted in the case of the tonnage of goods transhipped.

Hong Kong

In both incoming and outgoing traffic in the harbour of Hong Kong, there was in the second quarter of 1935 a noticeable improvement over the figures for the first quarter of the year. Thus, incoming traffic increased from 5,586 vessels with a tonnage of 5,000,000 r.t. in the first quarter of the year to 6,161 vessels with 5,340,000 r.t. in the second quarter. Similarly, outgoing traffic has shown an increase of from 5,822 vessels with 4,900,000 tons to 6,180 vessels with 5,320,000 tons.

Manchukuo

The total traffic in the harbour of Dairen in the month of July, 1935, amounted to 450 steamers with a tonnage of 1,270,000 tons.

Owing to its situation at the southern terminal point of the South Manchurian Railway, Dairen has of recent years acquired a growing importance as an exporting centre for Manchurian raw materials, such as coal, agricultural produce, and oilcake. Until more lately, however, imports have remained of comparatively little value. Only since the establishment of Manchukuo as an independent state, has the volume of imports shown appreciable improvement, as will be seen from the following table:—

Year	Total Exports Tons	Total Imports Tons
1930	5,439,000	888,000
1931	6,480,000	874,000
1932	7,203,000	1,465,000
1933	7,424,000	2,325,000
1934	7,660,000	3,074,000

Thus, it will be seen that during the past five years, whilst the weight of exports has not even increased by 50 per cent., that of imports has almost quadrupled. Dairen's improving position is now being threatened by the establishment and the rapid growth of the three North Korean ports, Seishin, Yuhi, and Rashin, which appear likely to draw a good deal of its traffic away from it. Consequently, a meeting was recently held of the leading harbour officials at which it was decided that to meet this increasing competition the construction of greatly improved facilities would be necessary. In addition it was suggested that new quays should be constructed at which vessels of a much greater draught could unload direct, whilst additional cranes, lighters, storehouses, and railway side-lines should be provided.

Japanese Possessions

Highly satisfactory progress is being made with the five-year programme for the extension of the harbour of Rashin, which is to cost in the neighbourhood of 30,000,000 Yen. It is expected that ten new storehouses and a large part of the new docks will be opened in November on the same date as the Yuki-Rashin Railway. In addition to this, the 300-metre long Pier No. 1, which is due for completion before the end of the year, will make possible the simultaneous discharging of cargo from two 10-thousand-ton steamers, thus enabling some 300,000 tons to be unloaded yearly. Pier No. 2, which will be provided with large storage sheds and a waiting room for passengers, is to be completed some time in the course of the next year, whilst Pier No. 3 is not to be ready until 1937. When all these works have been completed, the harbour of Rashin will have sufficient facilities for loading and unloading some 3,000,000 tons of cargo per year.

According to statistics recently published by the Customs offices, the goods traffic of the North Korean harbour of Seishin showed in the month of July, 1935, a considerable improvement over those for the same month of 1934, both as regards exports and imports. This will be seen from the following table:—

	July 1935 Value in 1000 Yen	July 1934 Value in 1000 Yen
Imports.		
Total	2,198	528
From Japan	1,603	139
From Abroad	595	389
Exports.		
Total	1,285	759
From Japan	940	559
From Abroad	345	200

Poland

Whilst in August the goods turnover of the harbour of Gdingen showed a great improvement, the actual sea-going traffic figures increased relatively slightly. The harbour was visited by 411 sea-going vessels with a tonnage of 420,000 n.r.t., an increase of 18,000 n.r.t. over the July figure, and 29,000 n.r.t. over the August, 1934, figure.

Belgium

An increase in the traffic of the harbour of Antwerp, which had already been noted in previous months, continued in August, when it was visited by 986 sea-going vessels with a net tonnage of 1,971,006 tons, as compared with 914 vessels with 1,781,732 tons in the same month of the previous year. A remarkable feature was the increase in the number of motor ships from 130 to 197. The total traffic for the first eight months of the current year amounts to 7,145 vessels with 14,155,817 tons, as compared with 6,749 vessels with 13,538,268 tons for the same period of the previous year.

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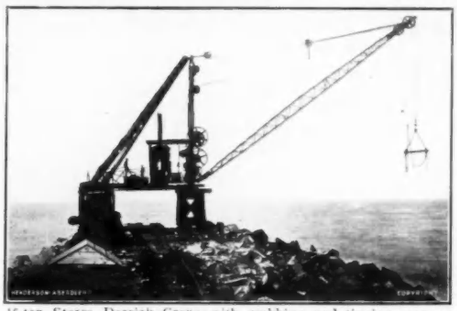

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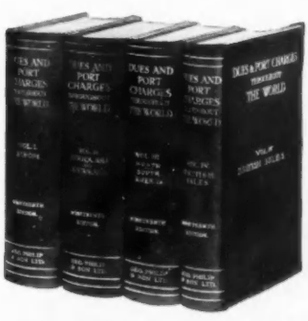

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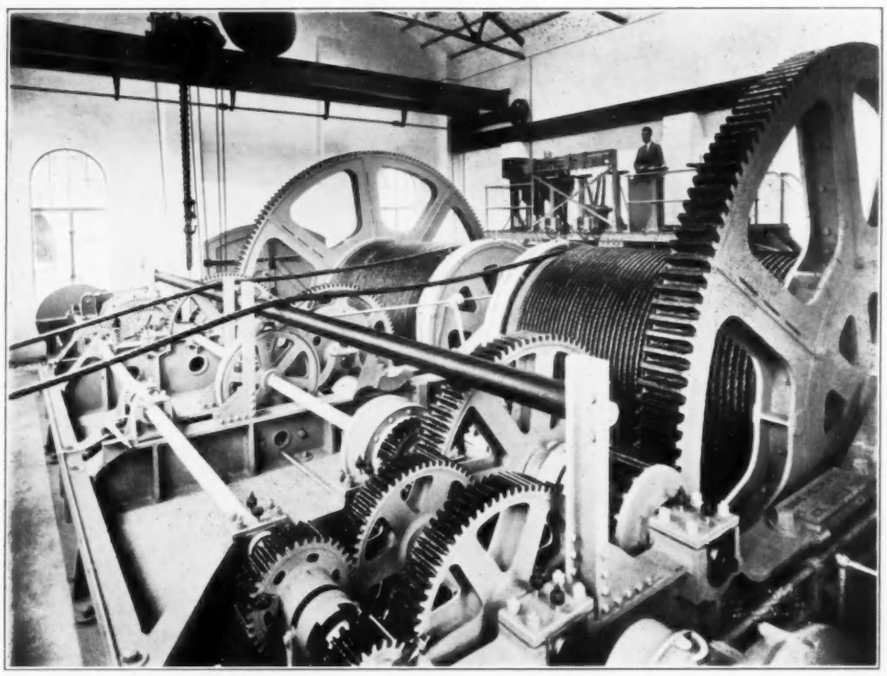

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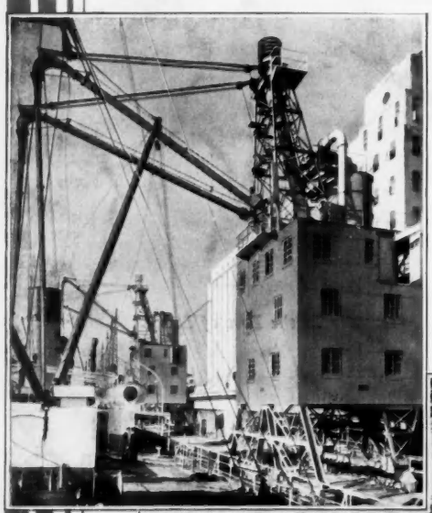

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